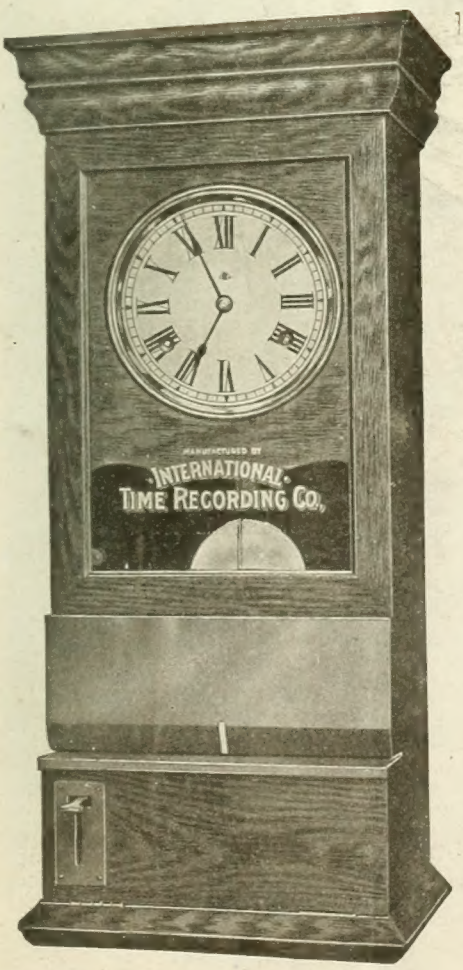
CANADIAN MACHINERY AND MANUFACTURING NEWS

A weekly newspaper covering in a practical manner the mechanical power, foundry and allied fields.
Published by the MacLean Publishing Company, Limited, Toronto, Canada

Vol. XXII., No. 17 Publication Office: Toronto, October 23, 1919 Subscription Price $3.00 per year.

"..... not worth the paper they are written on"



International Job Recorder
"Made in Canada"

We refer to Production Cost Figures that depend on pencil records.

What pencil records?

The time-cards on job work that your workmen or foreman now fill out in pencil.

Why aren't they good in pencil?

Because pencil records can be changed and a working-time balance can be forced.

And, if your factory production costs are "leaky" the whole question of your costs, your overhead, etc., is "up in the air."

The International Job Recorder absolutely corrects this condition. It enforces a printed, machine-made, unchangeable, infallibly accurate record of the time spent on any job or operation.

It does many other profitable things for its users. Let us tell you more about them.

International Business Machines Co., Limited

FRANK E. MUTTON
Vice-President and General Manager

Head Office and Factory:
300 Campbell Ave., Toronto

Also at - Montreal
Winnipeg Vancouver

(Also makers of Dayton Computing Scales and Hollerith Electric Tabulators)

SMALL TOOLS

Pratt & Whitney Adjustable Blade Reamers

These reamers have eccentric relief and can be set to size without regrinding. They are unexcelled for design and simplicity and ease of adjustment.

The eccentrically relieved blades are stronger than others, do not chatter, and produce a smoother hole. The hand, shell and fluted chucking reamers have interchangeable nuts, screws and wrenches. The bottom of a hole can readily be faced.

By a simple adjustment of the blades the reamer can easily be set to size, without regrinding.

Prompt service is assured at our nearest store, where P. & W. Small Tools are carried in stock for immediate delivery. Place your order there to-day.

PRATT & WHITNEY CO.
OF CANADA, LIMITED
Works: Dundas, Ontario

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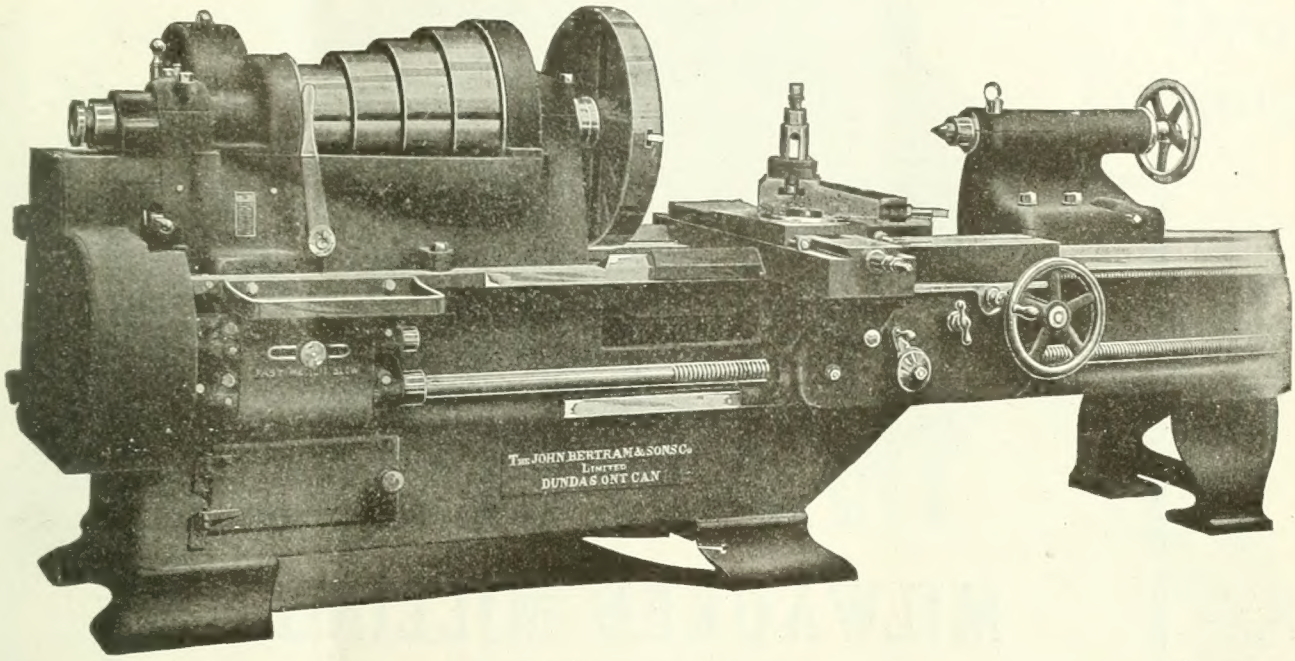
PRATT AND WHITNEY

BERTRAM MACHINE TOOLS



Double Back Geared Gap Lathe

26-inch x 42-inch Swing

Bertram Machine Tools are built for safety and service, and are backed by a concern with sixty years' experience and the largest of its kind in Canada.

The John Bertram & Sons Co., Limited

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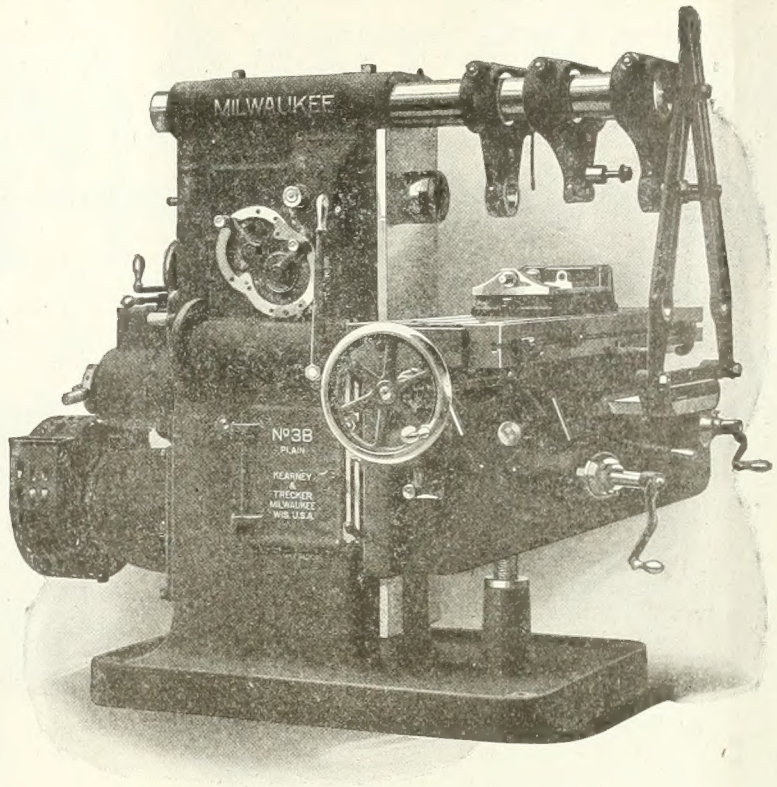
Canadian Machinery and Manufacturing News, October 23rd, 1919. Vol. 22, No. 17. Published weekly at 143-153 University Ave., Toronto, Canada. Subscription price in Canada, $3; United States, $3.50. Entered as second-class matter at the Post Office Department, Ottawa, Canada. Entered as second-matter July 1, 1912, at the Post Office at Buffalo, under the Act of March 3rd, 1879.



MILWAUKEE MILLING MACHINES

Double Overarm maintains alignment.

It is impossible for the operator to place the arbor supports on the arbor and double overarm in any other way than in line. Arbor cannot be pounded out of line when using large, coarse pitch cutters on rough, heavy work.

Other Distinctive Milwaukee Features:

Solid top knee—hardened steel gearing and shafts in the column and feed box—automatic flooded lubrication — one and one-half gallons of oil per minute pouring over all gears and bearings in the column and feed box, insuring lubrication at all times—flanged spindle with hardened steel collar for driving arbors—constant speed drive, reverse being self-contained.

Send for our No. 21 Catalogue. Illustrating and describing Milwaukee Milling Machines and accessories in detail

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Hamilton Pig Iron

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STEEL COMPANY
OF
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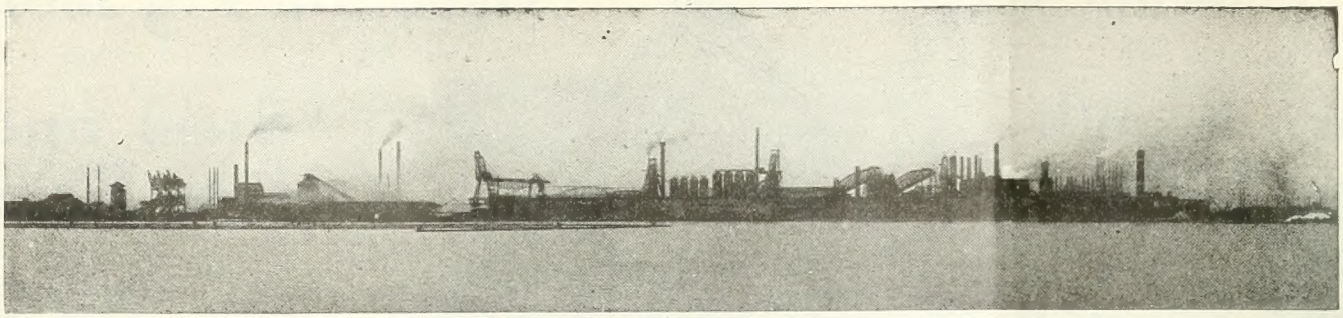


General View of the Plant of the Algoma Steel Corporation from the Waterfront.

ANNOUNCEMENT

MARK OF ALGOMA O.H. QUALITY

THE ALGOMA STEEL CORPORATION, LIMITED, take pleasure in announcing to their customers and the Canadian trade that in accordance with the widespread desire throughout the Dominion that there should be obtained in Canada with Canadian labor, a much larger proportion of the requirements of this country in STEEL SECTIONS for STRUCTURAL PURPOSES, CAR CONSTRUCTION, SHIPBUILDERS' REQUIREMENTS, etc., they are just completing extensive alterations and additions to their rolling mills, and on or about 1ST NOVEMBER, will be ready to produce and ship American Standard Sections of BEAMS and CHANNELS up to and including 15", all standard sections of ANGLES from 6" x 6" down to 1¼" x 1¼", ZEE BARS for car builders and general purposes, small and large ROUNDS and SQUARES, and FLAT BARS up to 14" wide. The quality of the product is already well known to the trade, and is exclusively steel made by the Open Hearth process. and can be furnished in all grades from the softest rivet stock to high carbon special spring material.

The following are the sections which will be rolled:---

ANGLES—Equal Leg—
6 x 6"—5 x 5"—4 x 4"
3½ x 3½"—3 x 3"
2½ x 2½"—2¼ x 2¼"
2 x 2"—1¾ x 1¾"
1½ x 1½"—1¼ x 1¼"

ANGLES—Unequal Leg—
6 x 4"—6 x 3½"—5 x 4"
5 x 3½"—5 x 3"—4½ x 3"
4 x 3½"—4 x 3"—3½ x 3"
3½ x 2½"—3 x 2½"—3 x 2"
2½ x 2"

BEAMS—
15", 12", 10", 8", 6", 5", 4", 3".

CHANNELS—
15", 13", 12", 10", 8", 6", 5", 4", 3".

ZEES—
3¼ x 5 x 3¼ x 5/16
3 5/16 x 5 1/16 x 3 5/16 x ⅜"
3⅜ x 5⅛ x 3⅜ x 7/16"
3 1/16 x 4 x 3 1/16 x ¼"
3⅛ x 4 1/16 x 3⅛ x 5/16"
3 3/16 x 4⅛ x 3 3/16 x ⅜"
2 11/16 x 3 x 2 11/16 x ¼"
2¾ x 3 1/16 x 2¾ x 5/16"

ROUNDS—
All sizes from ½" up to and including 4".

SQUARES—
All sizes from ½" up to and including 3".

FLATS—
All sizes from 1 x ¼" up to and including 14" wide.

MINE RAILS—
All sections from 12 lbs. up to and including 45 lbs. per yard.

PIG IRON—
Machine cast FOUNDRY MALLEABLE and BASIC.

SULPHATE OF AMMONIA.
NITRE CAKE.

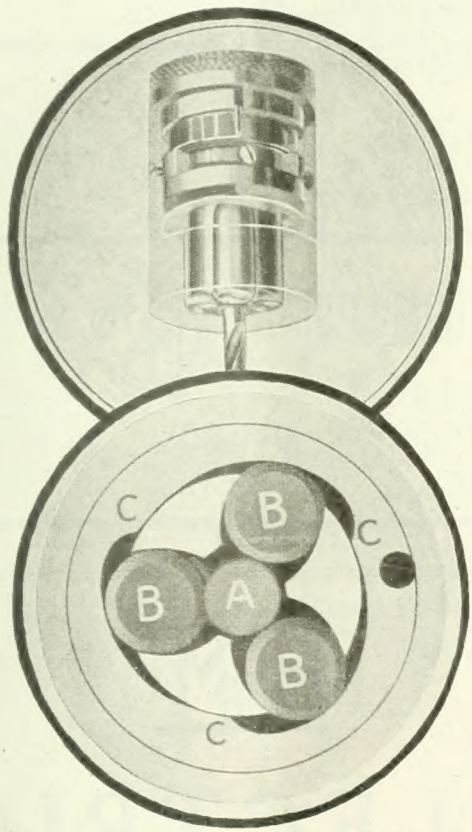
For the better convenience of customers who may find it necessary to secure rush shipments of particular items, they contemplate keeping a large stock of all the various standard sections constantly on hand, and to this end extensive warehouse facilities are being prepared.
Your enquiries and business will be appreciated.

ALGOMA STEEL CORPORATION

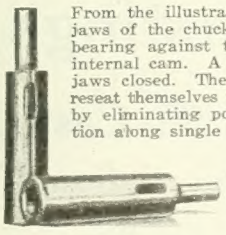
SAULT STE. MARIE, ONTARIO

SKF AUTOMATIC-QUICK ACTING SELF CENTERING DRILL CHUCKS

Suggestion No. 2 →



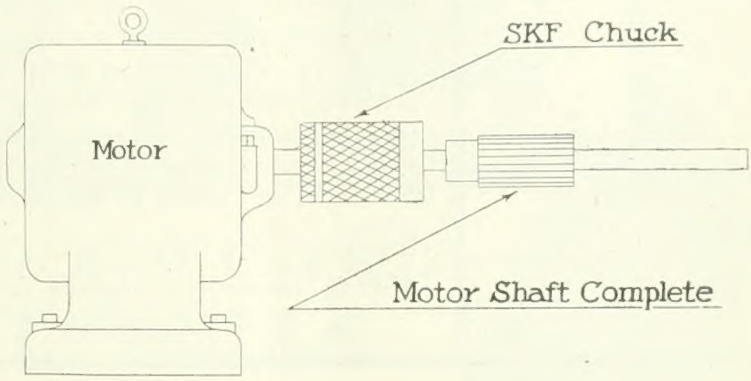
A—*Drill Shank*
B—*Roller Jaws*
C—*Cam Surfaces*



Increase Size Range by using Adapters

From the illustration it will be seen that the jaws of the chuck are formed by three rollers bearing against the surfaces of a three-lobed internal cam. A coiled spring holds the roller jaws closed. The rollers are free to turn and reseat themselves with every drill release, thereby eliminating possibility of wear or indentation along single line of contact. The drilling resistance forces these rollers up the cam surfaces, causing them to close upon and grip the drill shank with a power always proportionate to the drilling stress, thereby precluding slipping of the drill under any conditions whatsoever.

For Polishing Small Motor Commutator



Polished and Removed without Stopping the Motor

THE S K F Chuck is a drill chuck in only the ordinary sense of the word. In hundreds of plants all over the country it is doing things never even associated with an automatic drill chuck.

For instance, the above drawing shows how one manufacturer mounts an S K F Chuck on the end of a motor shaft, to receive small parts for polishing. All day long, small armatures and shafts are inserted, polished and removed without even stopping the motor for a minute.

This is only one special application of the S K F Chuck. Other applications showing the uses of this novel chuck are illustrated in additional booklets which will be sent on request.

CANADIAN SKF COMPANY, LIMITED

EASTERN SALES OFFICE :
412 ST. JAMES ST.,
MONTREAL

HEAD OFFICE :
KING ST. WEST,
TORONTO

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OUR AIR COMPRESSORS ARE ACCESSIBLE

One of the most important points about an air compressor is that it should be so built that inspection and cleaning can be done with the least amount of trouble. The horizontal type of construction which we have adopted is particularly handy—cylinder valves, etc., are readily accessible; crossheads and guides can be inspected and cleaned without unscrewing bolts and removing plates; and the crank, etc., are available for inspection simply by lifting off a cover.

Write for our compressor bulletins for further information.

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Industrial Bridges, Buildings, Towers, Smoke Flues and Stacks, Chutes, Coal Bins, Ore Bins, Tanks, Cranes, Engine Houses, Grain Elevators, Derricks.
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Of Every Description

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WELLAND ONTARIO

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TWIST DRILLS
REAMERS AND MILLING CUTTERS

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The Keystone Upon Which All WILT Products Are Built

A high standard of perfection is maintained throughout the various processes of manufacturing **WILT High Speed and Carbon Twist Drills, Reamers and Milling Cutters. WILT** products improve production! This is no theory, no untested statement, but an established fact backed by many of the largest manufacturers throughout Canada. For steady, reliable output of work that is satisfactory from the standpoint both of quantity and quality there is no better choice than **WILT Products.**

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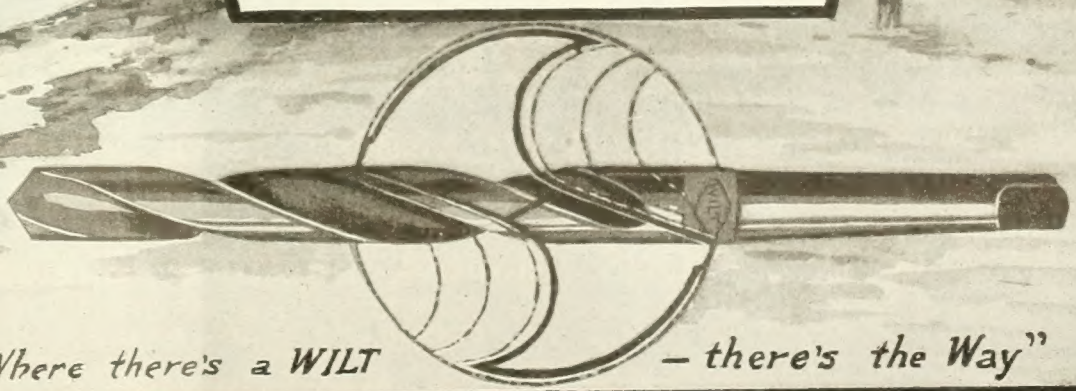
OF CANADA, LTD. WALKERVILLE, ONT.

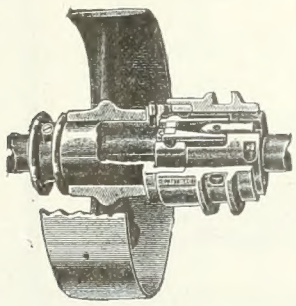
London Office: Wilt Twist Drill Agency, Moorgate Hall, Finsbury Pavement, London E.C. 2, England.



"Where there's a WILT — there's the Way"

If interested tear out this page and place with letters to be answered.

THE JOHNSON FRICTION CLUTCH



Standard Single Clutch with Pulley Mounted on Hub —Clutch Engaged

MANUFACTURERS who are particular about keeping an established reputation equip all their machines with Johnson clutches. They recognize that superiority must be consistent in order to count. And Johnson clutches assure them of uniformly good service wherever they are installed.

Other clutches might work well in some cases—but Johnson clutches are *sure* for all purposes. We study each application on its own conditions, and build a clutch that is just right for the job.

When you are tired of experimenting, let us have a chance.

WRITE FOR OUR YELLOW DATA SHEETS

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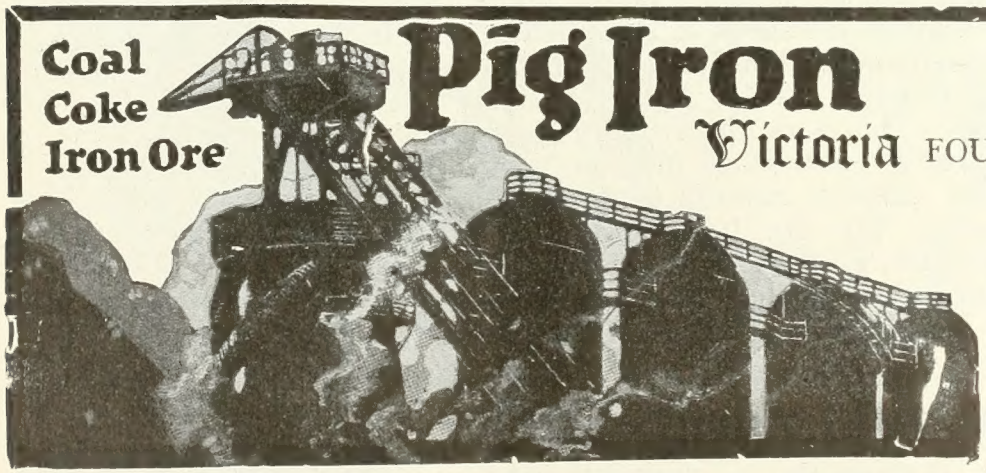
CANADIAN FAIRBANKS-MORSE CO., LIMITED, Montreal, Toronto and Winnipeg

THE CARLYLE JOHNSON MACHINE CO. MANCHESTER CONN.

Coal
Coke
Iron Ore



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Made by The Canadian Furnace Co.
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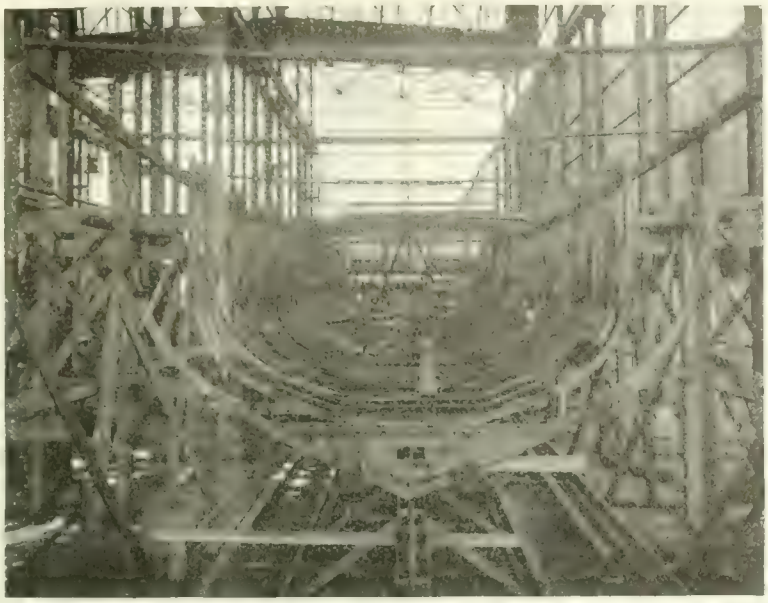

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Electric furnaces, automatically regulated, the most modern methods, and the introduction of Uranium — make this a steel of truly remarkable cutting properties.
We know "Electrite" cannot be bettered — and stand ready to prove it to you.

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Swedish Steel & Importing Co., Limited

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Direct representatives of foremost Swedish mills: makers of

Tool Steels

ALLOY STEELS, BILLETS, BARS, DISCS, SHEETS, HIGH SPEED STEELS, DRILL RODS, DRAWN BARS, SEAMLESS TUBING, COLD ROLLED STRIP STEEL, WELDING WIRE, WROUGHT AND ROLLED IRON, PIG IRON, STEEL AND IRON ENDS, HOLLOW AND SOLID MINING DRILL STEEL.

TRADE MARK
SS
DOUBLE ESS

PROMPT SHIPMENTS from large stock

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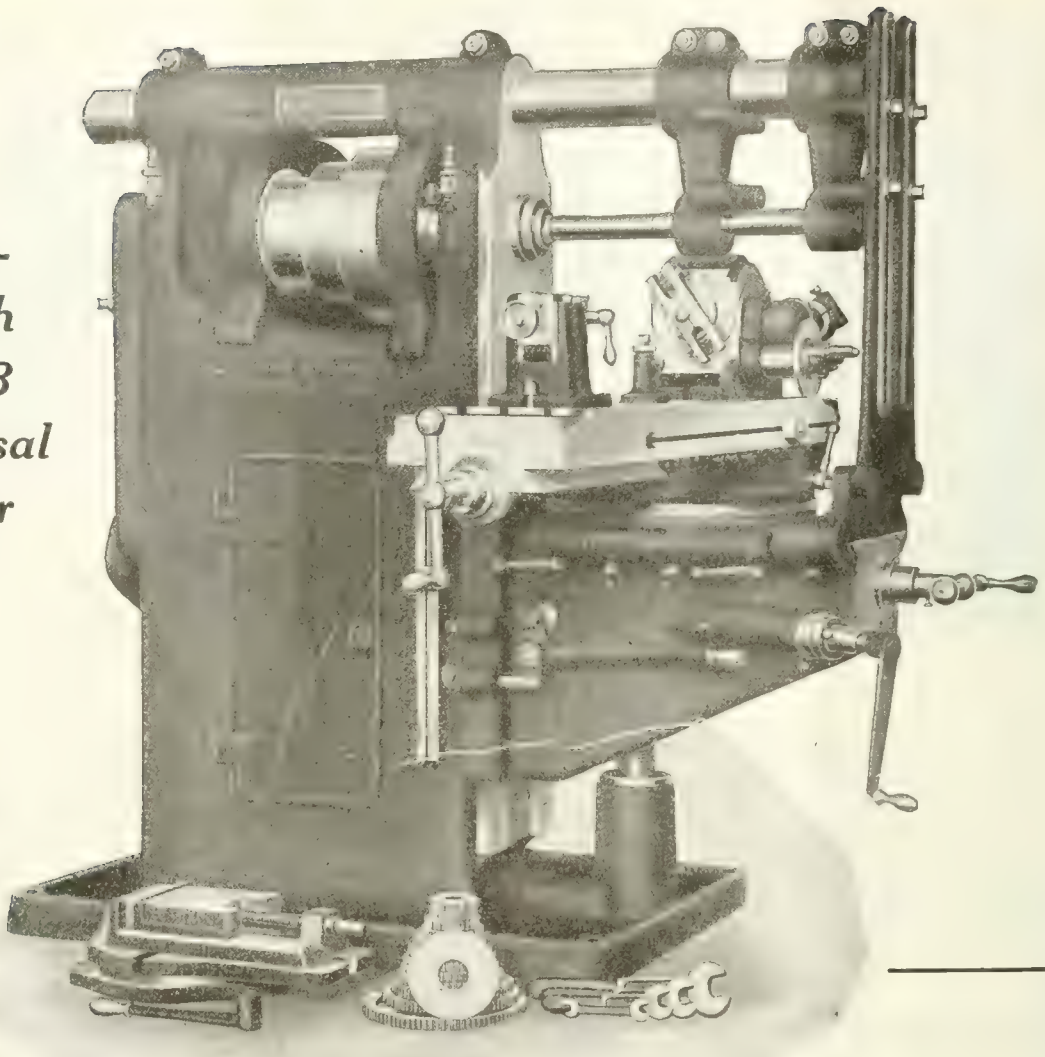
Ford-Smith No. 3 Universal Miller



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Milling Machines and Attachments

The *Ford-Smith* No. 3 Universal Miller is adapted for heavy manufacturing or the most exacting tool room service.

Fast and accurate, and constructed of most durable materials.

The *Ford-Smith* is built in a suitable range and capacity for every class of milling.

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Manufacturers of Milling Machines, Grinders, Disc Grinders, Polishers and Special Machinery

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INTRA STEEL *GIBRALTAR STEEL*

Tool Steel for Every Purpose

SWEDISH LANCASHIRE IRON.

Twist Drills, Taps, Hack Saw Blades, Milling Cutters, Files, Etc.
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Our guaranteed analysis Brass Ingot Metal will save you money in your metal purchases, also you have the positive assurance of exactness and accuracy of quality, and in casting the elimination of melting losses and defective castings.

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A rearrangement of your patterns might cut their cost 25%; a different method of molding them might double your production at no increase in molding cost. We can advise you and we have expert metal and wood pattern-makers who are able to make any changes that may commend themselves to you.

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send us a sample, blueprint or sketch, and ask for our advice. It won't cost you anything. If our advice is good and commends itself to you, it is only fair to assume that our work will be equally satisfactory, and we need the work as badly as you need the patterns.
We are in a position to do turning, boring, drilling or other semi-finishing operations on castings supplied by us.

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If what you need is not advertised, consult our Buyers' Directory and write advertisers listed under proper heading.

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HIGH-SPEED AND CARBON
TOOL STEEL

MISCELLANEOUS SHOP TOOLS

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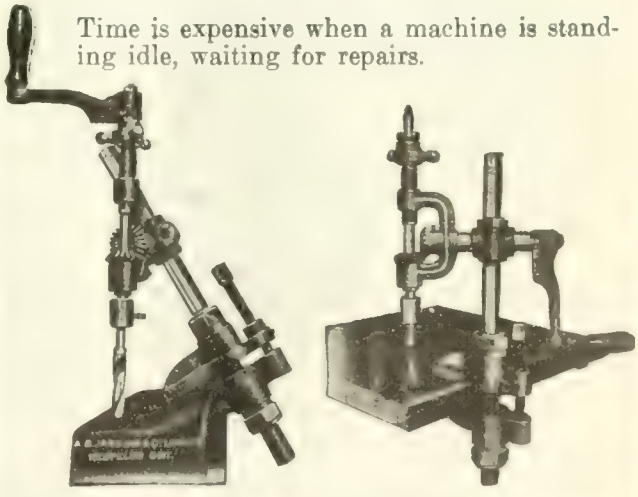
Jardine Universal Ratchet Drill

Time is expensive when a machine is standing idle, waiting for repairs.



On the average repair job, this machine completes the drilling in less than the time required to set an ordinary ratchet to begin.

Weight, 40 lbs. Price, $26.50 net

Sold by all Machinery and Supply Houses

A. B. JARDINE & CO., Limited
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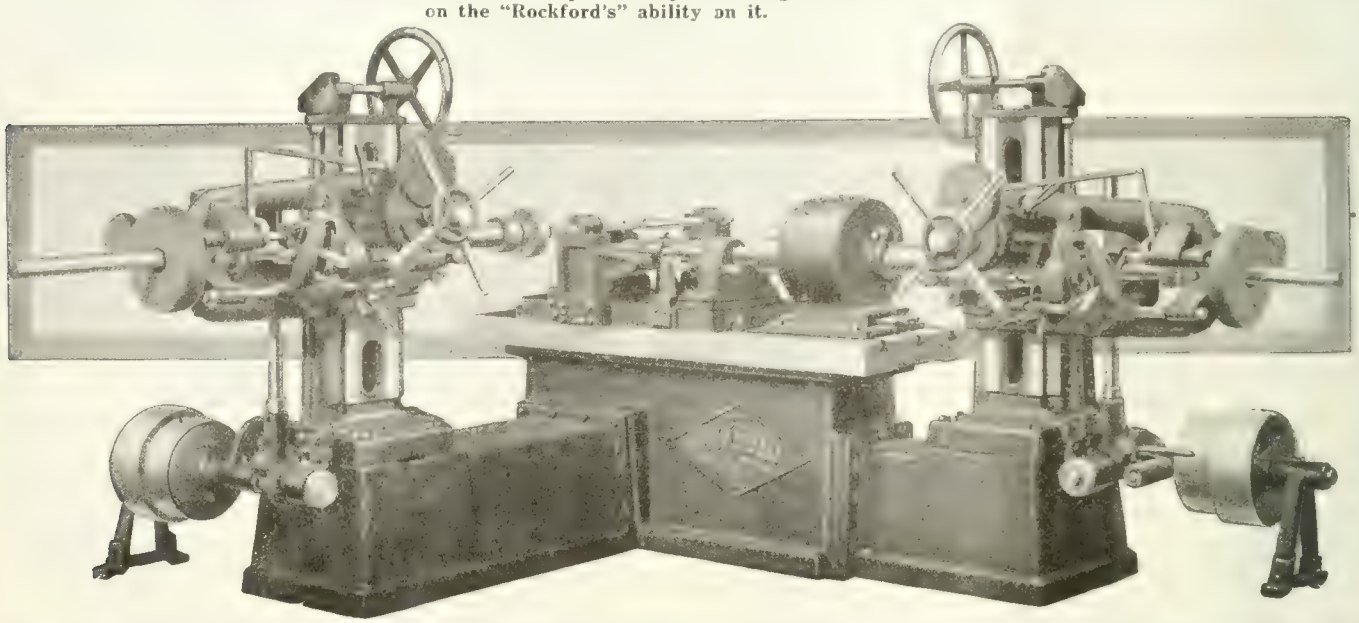
Rockford Horizontal Boring Machine

For Automobile Manufacture

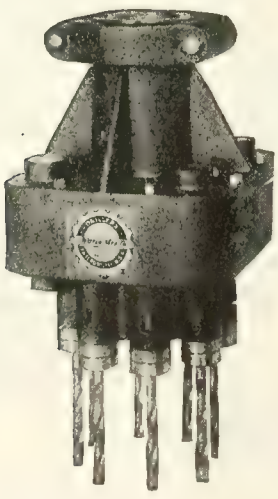
This tool is unusually rapid and accurate in the boring of crank cases, transmission cases and rear axles. Has two heads at right angles to each other. Spindles bore longitudinal and cross holes in work simultaneously.

Send us blue prints of your boring work and we will give you figures on the "Rockford's" ability on it.



The Rockford Drilling Machine Co., Rockford, Ill.

2 Minutes or 20?



This Is The Vital Question

Do you drill ten holes in the time it takes for one? The Hoefer Auxiliary Head equips any driller so as to accomplish this big saving in time. It speeds up production in drilling tremendously. Not only do you save the drilling time, but also the time now lost in shifting the jigs and raising and lowering the spindle for the extra holes.

Hoefer Auxiliary Heads are made in any multiple, arranged in any manner, from 2 up. They are made by expert tool makers and unqualifiedly guaranteed to handle accurately the work for which they are designed.

Investigate now—every day you use a single drill where the multiple may be used you are paying for an auxiliary head through increased costs, but not securing its benefits.

Write for catalog. Send a blueprint of some of your work for estimate of time and cost.

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621 Washington Blvd., Phone Haymarket 2408, Chicago, Illinois; 1113 Citizens' Bldg., Phone Main 795, Cleveland, Ohio; 708 Empire Building, Phone Court 1911 or 1912, Pittsburgh, Pa.; 602 Kerr Building, Phone Cherry 2884, Detroit, Mich.; 30 Church Street, Phone Cortland 1615, New York City; Badger-Packard Mchy. Co., Milwaukee, Wisconsin; National Supply Co., Toledo, Ohio; John M. Howett, 18 W. Second St., Dayton, Ohio.

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"Canada's Departmental House For Mechanical Goods"

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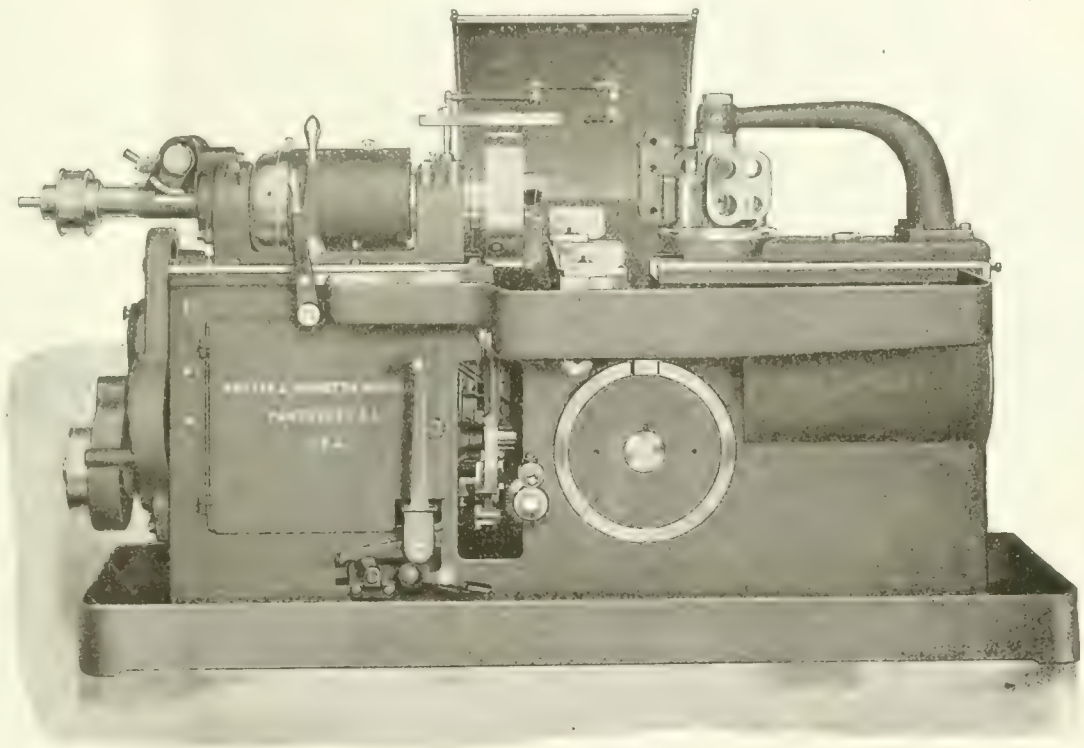
P&J AUTOMATICS

For Every Service

Built in three sizes: 5-A, 6-A, 7-A Models, for automatically turning, forming, boring, threading and facing duplicate parts up to 40 inches diameter and 15 inches long.



5A MANUFACTURING AUTOMATIC

One attendant operating two to six machines means lowest possible labor costs.

Boring and turning tools piloted insures accurate results.

Send drawings or samples for estimate which will show you the way to economical production through the use of Manufacturing Automatics.

Bulletin No. 39

Canadian Offices: POTTER & JOHNSTON MACHINE CO.

ROELOFSON MACHINE & TOOL CO., LTD.

HEAD OFFICE: 1501 ROYAL BANK BUILDING, TORONTO, CANADA
WORKS AND WAREHOUSE: GALT, ONTARIO, CANADA

If interested tear out this page and place with letters to be answered.

Built For a Long

Because Robertson Process Metal does not need paint, because it is rust proof, because it will withstand the most severe weather exposure and because it is unaffected by strong acid and alkali fumes, it is a permanent, economical building material. By offsetting depreciation and protecting plant investments it has saved plant owners many thousands of dollars.

To know how Robertson Process Metal is made is to understand why it is so enduring. It is made in sheets, and bars. Its body or core, of specially prepared steel, is thoroughly cleansed and covered with three impervious coatings, (1) Asphalt, (2) Asbestos, (3) Water-proofing.

The steel is heated to a uniform and definite temperature and immersed in the asphaltic bath. While the asphalt is still hot it is completely covered with a sheet of asbestos felt and subjected to pressure which thoroughly binds the two protective coats. A coating of water-proofing, forced into the surface by pressure completes the process of protection.

Robertson Process Metal finds its most ready use in sheet form for the roofing and siding of industrial buildings. It is produced in various standard forms and shapes for building trim. Robertson Skylights and Robertson Ventilators are two building products which owe their long life to Robertson Process Metal.

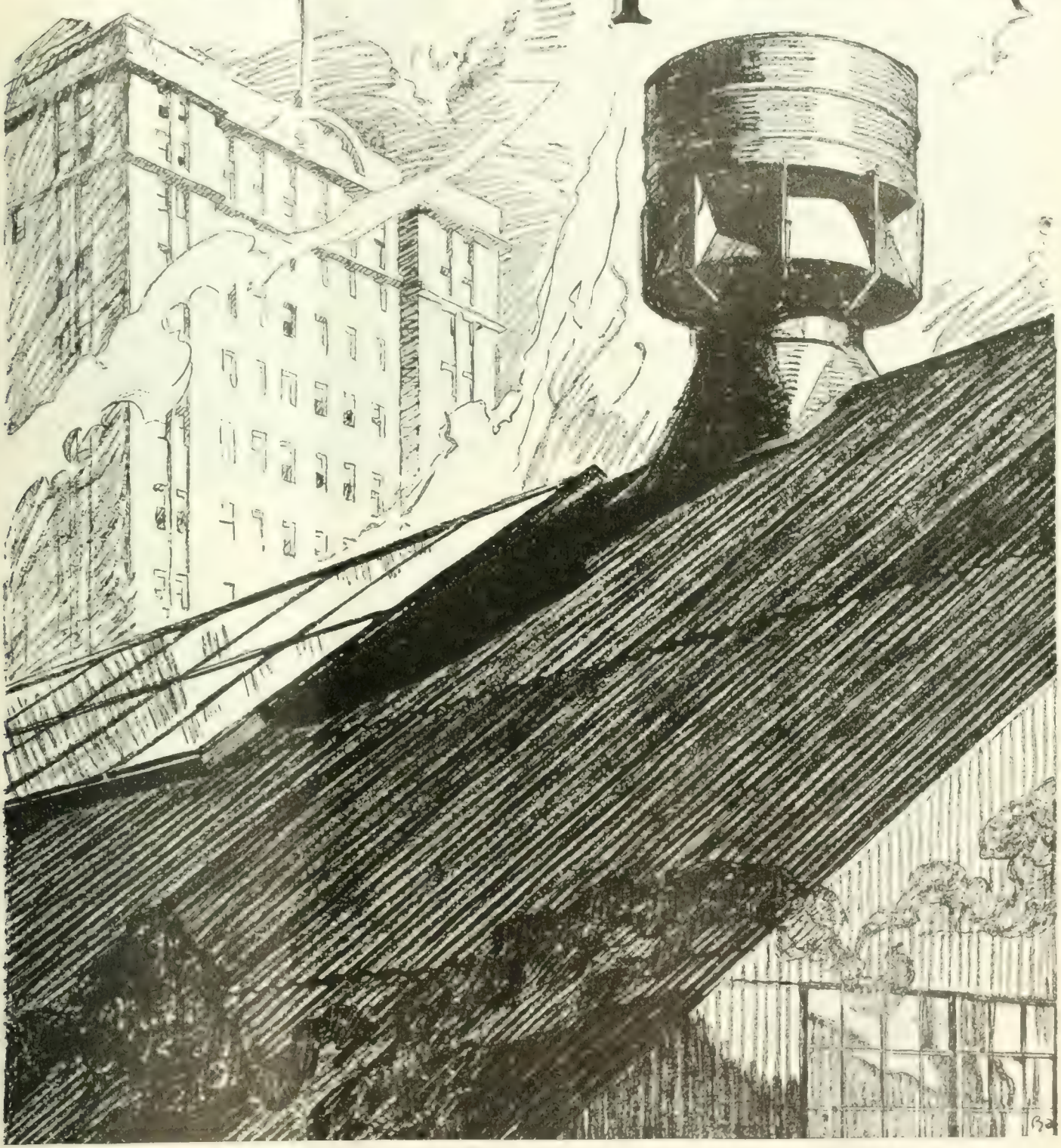
A special bulletin containing descriptions of this product and illustrations of plants where it has been in use for many years will be sent upon request. A general book covering the three basic materials: Robertson Process Metal, Robertson Process Gypsum and Robertson Process Asphalt is also available.

H. H. ROBERTSON COMPANY, Limited
Sarnia, Ontario
Branch Offices: Toronto, Montreal, Vancouver

ROBERTSON
BUILDING PRODUCTS

If what you need is not advertised, consult our Buyers' Directory and write ... firms listed under proper heading

Life of Exposure



PROCESS
HIGHWAY MATERIALS

TRADE MARK REG. U. S. PAT. OFF.

If interested tear out this page and place with letters to be answered.

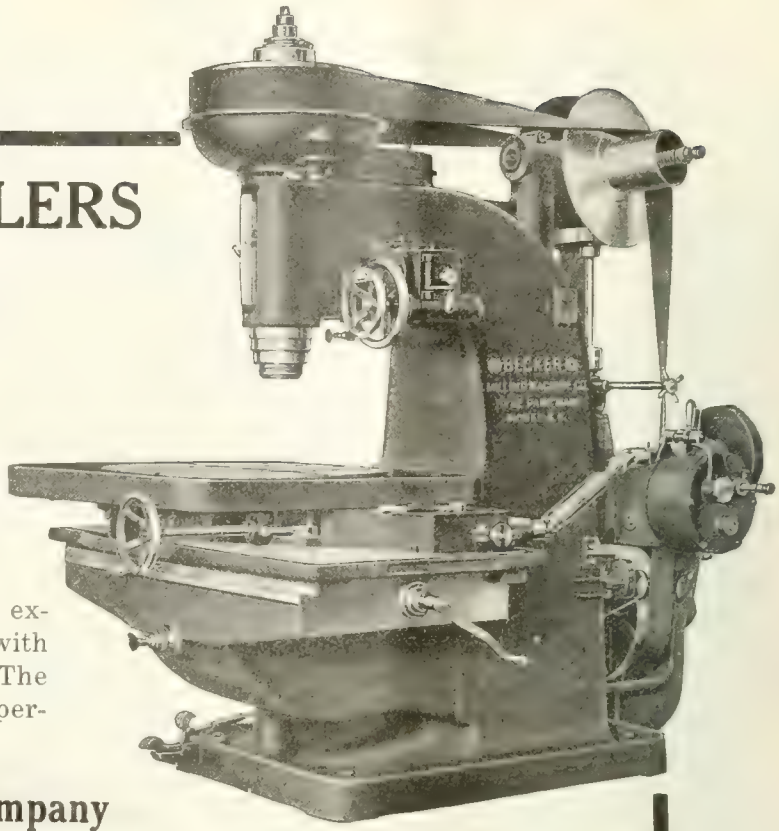
BECKER BELT-DRIVEN MILLERS

for

GREATER PRODUCTION because they work continuously—every hour of operation is a production hour—

ECONOMY OF OPERATION because they are power savers; the internal belt drive forms an elastic drive to the spindle that prolongs the life of the cutter by eliminating chatter and vibration.

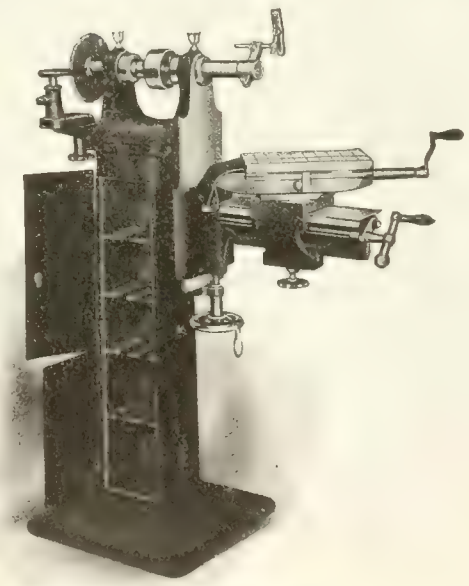
ACCURACY because the machines have exceptionally fine feeds and are equipped with micrometer dials and stop gauges. The Patent Becker Gibbing keeps the work permanently aligned with the spindle.



Becker Milling Machine Company
HYDE PARK, BOSTON, MASS.

A. R. WILLIAMS MACHINERY COMPANY, LIMITED, - 64 FRONT STREET WEST, TORONTO
RUDEL-BELNAP MACHINERY COMPANY, LIMITED, - - 137 McGILL STREET, MONTREAL

OBTAIN THE BEST RESULTS



GARVIN No. 3, Universal Cutter and Surface Grinder
Use Code—Banish

From Cutters and Tools Kept Sharp on

GARVIN No. 3 UNIVERSAL

CUTTER AND SURFACE GRINDERS

Simple Light Running Accurate

The spindle is hardened and ground and supported out close to the wheel by an extended bearing, and carefully protected from emery.

The knee and the yoke carried on the knee both have a large range of adjustment. On the knee yoke or carriage is mounted the swiveling table, which has a quick, sensitive movement by rack and pinion operated from end or side.

On this table is mounted the index head, and all the attachments are held in this head.

An outfit of emery wheels, mandrels, bushings, wrenches, etc., is supplied with the machine.

Machine is designed to keep its original factory accuracy.

CAPACITY: CUTTERS, 14" x 6"; SURFACES, 9½" x 6"

For Further Information ASK YOUR DEALER or WRITE US DIRECT

IMMEDIATE DELIVERIES

Send for Complete Catalog

Manufactured by

THE GARVIN MACHINE COMPANY

Spring and Varick Streets ***(Visitors Welcome)*** **50 Years New York City**

Tires Led the way to Better Hose

THE hose industry stretches back into the early days of rubber history.

For year after year rubber hose had been built upon the immature principles of those early days.

But Goodyear has developed new and higher standards of hose efficiency.

Just as broad-visioned Goodyear chemists and engineers cut loose from tradition and built tires in a better way, so have they built industrial hose.

Old processes—obsolete methods have been forgotten. Only those processes, formulae and methods proved by service tests and experiment to be best enter into the manufacture of Goodyear Industrial Hose.

Hose linings which do not crack or harden have been developed.

Outer covers with an exceptional degree of toughness to withstand the wear of severe industrial service—another distinctly Goodyear feature.

In a word, Goodyear has built better hose. Original cost did not count if greater final economy and increased efficiency were a sure result.

You cannot know how far short of complete satisfaction ordinary hose falls until you experience the greater perfection of Goodyear Industrial Hose.

Give Goodyear Hose a trial now. There is a particular Goodyear Hose for every industrial purpose—water, steam, pneumatic tool, air drill, railway, fire, suction, etc.

Phone, wire or write to the nearest branch for a man trained in hose problems to study your needs. No obligation.

The Goodyear Tire & Rubber Co. of Canada, Limited

Halifax, St John, Quebec, Montreal, Ottawa, Toronto, Hamilton London Winnipeg, Regina, Calgary, Edmonton, Vancouver.

GOODYEAR
MADE IN CANADA
INDUSTRIAL HOSE

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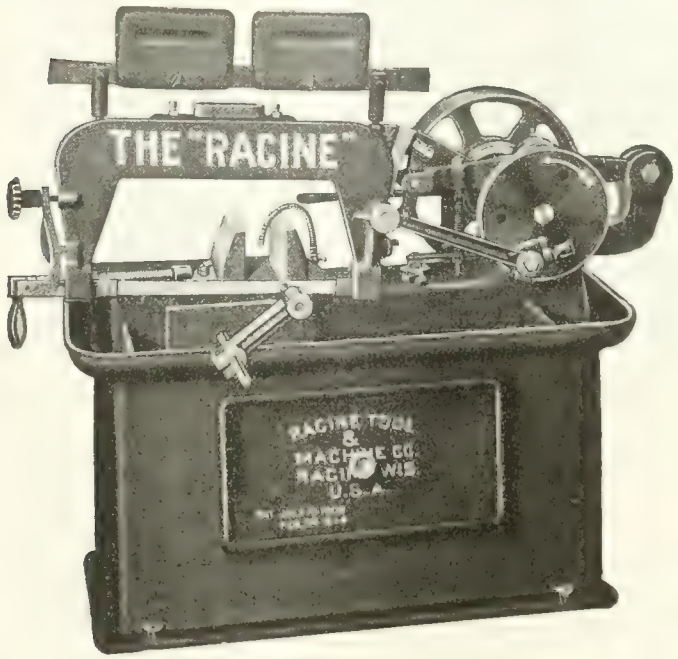
Standard the World Over

"THE RACINE"



HIGH SPEED METAL CUTTING MACHINE

Reduces Blade Expense

Aside from its ability to turn out more work than any other metal cutting machine, "THE RACINE" will save you considerable money on blades alone—enough to pay for itself in a reasonable time. The automatic lifting device is responsible for that. It automatically raises the blade on the return stroke, relieving it of all dragging or strain. This also means quicker cutting, less power used and greater production.

There are many ways "THE RACINE" will prove a big saving. Let us tell them to you.

Use "Racine" H.S. Tungsten Power Blades

Racine Tool & Machine Co.
Melbourne Avenue, - RACINE WIS. U.S.A.

SIMONDS
HACK SAW BLADES
UNEQUALED IN QUALITY ANY SIZE OR LENGTH

Simonds Canada Saw Co. Limited
ST. JOHN MONTREAL VANCOUVER

HOYT METALS

"Frost King"
"Trojan"
"Nickle Genuine"
BABBITTS

Hoyt Metals have been used with great success for many years.
Put them to the test and you'll soon see a difference in your babbitt cost.
All elements entering into our mixtures are carefully refined and put together in such proportions and in such relation to each other that the best possible alloy is secured for the work for which it is designed.
Annual sales over $5,000,000.

Hoyt Metal Co., Toronto
New York, N.Y. London, Eng. St. Louis, Mo.

HACK SAWS AND GUMPTION

Every box of Starrett Hack Saws has everything in it that means economical work, except common sense or gumption. It's up to the man who uses the blades to supply that.

If he'll follow the Starrett Hack Saw Chart he's sure to use the right blade for each material—and that's a big step in the right direction. But to get everything out of a Starrett Blade that we put into it, he's got to use common sense.

Hack Saws won't cut economically without pressure or weight. They won't keep on cutting economically unless the weight is increased as the saw becomes dull. A blade won't keep its temper without the use of plenty of lubricant to cool it and it won't do its best if the work is cornered wrongly in the vise. But any Starrett Hack Saw, used according to the recommendation of the Starrett Hack Saw Chart, plus the common sense that every good machinist has, will prove what most users say of Starrett blades—"They cut quicker and last longer." Ask for Catalog No. 21-3 sent free.

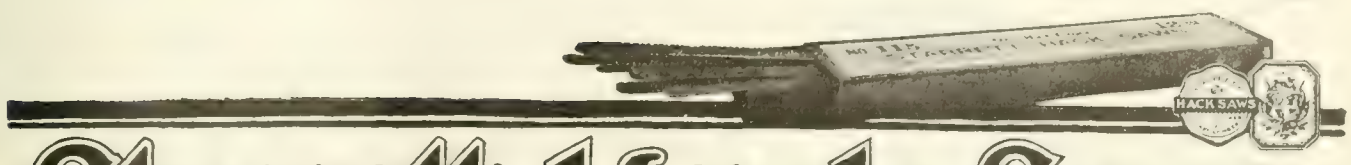
THE L. S. STARRETT CO.

The World's Greatest Toolmakers
Manufacturers of Hack Saws Unexcelled

ATHOL, MASSACHUSETTS

NEW YORK LONDON CHICAGO

42-971



Starrett Hack Saws

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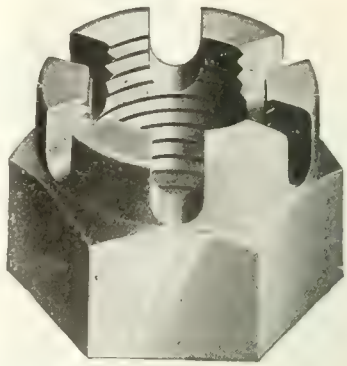
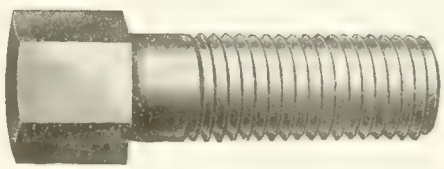
Ready for Delivery

SCREWS—Cap—V.—U.S.S.—S.A.E.
Set—U.S.S.—V.

NUTS—Plain—S.A.E.
Castellated—S.A.E.
Semi-Finished—V.—U.S.S.





MADE TO SPECIFICATIONS

Special Screw Machine Work in Sizes up to 2¼ diam. 10½" long.

THE NATIONAL ACME COMPANY

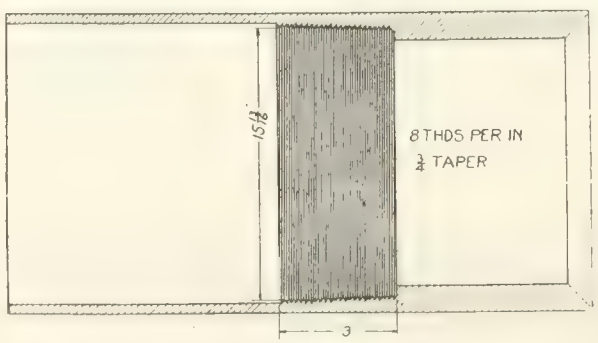
DE COURCELLES & G.T.R. MONTREAL, P.Q.

SMALLEY-GENERAL

THREAD MILLING MACHINE

Cost-Cutter :: Time-Saver

Saved 29 Minutes on This Job



Typical Operation and Time Study

Machine—No. 1 Thread Miller.
Piece Milled—Drive Shoe.
Thread—16¼ inches diameter, 3 inches length, 8 pitch, Briggs std., tapered thread.
Milling Feed—7 inches per minute.
Material—.55 carbon steel; air collet chuck used.
Time Study—Seven minutes floor to floor for complete operation.
Note—Former time, 36 minutes chasing in a lathe.

Are you not convinced that Smalley-General Thread Millers can save you time and expense? Let us have blueprints for time study of your work.

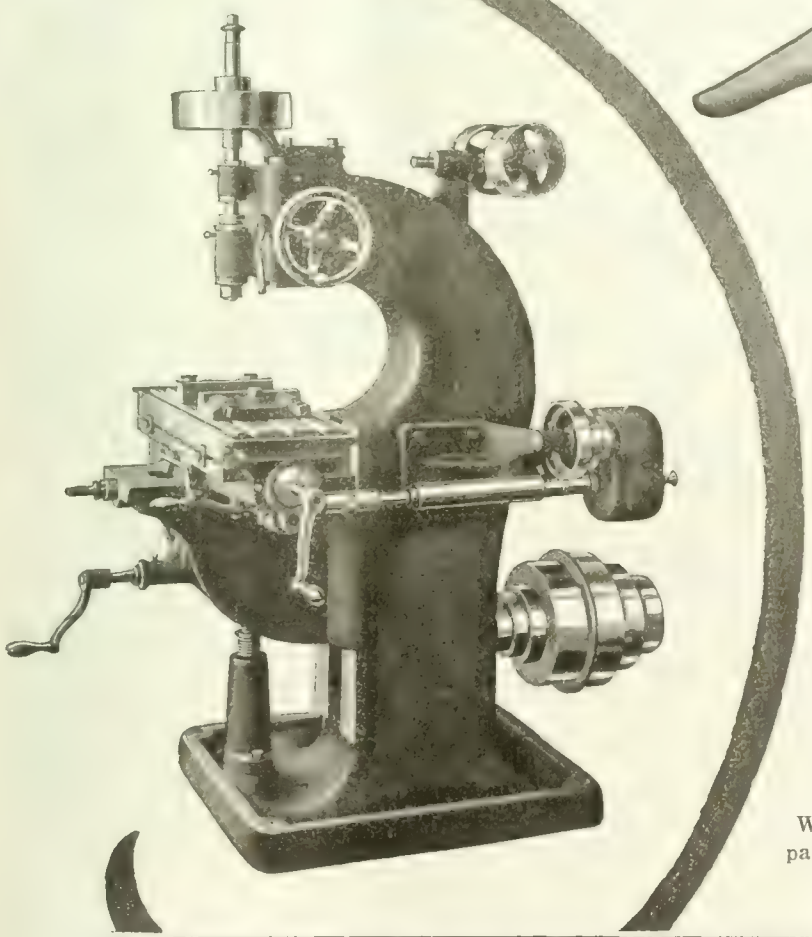
SMALLEY-GENERAL, Inc., BAY CITY, Mich.

Canadian Agents: Rudel-Belnap Co., Ltd., Montreal and Toronto

BRISTOL

Bristol Vertical Milling Machine

A Tool of Large Capacity



Ball Bearings are used at the most important points making it a free running tool, which, combined with its being a belt-driven machine, makes it capable of turning out work on which an extra smooth finish is desired.

The longitudinal table feed is controlled by the gear change box which gives six different feeds for each change of spindle speed. A stop to gauge with micrometer adjustment is used on the head to regulate the depth of cuts.

Learn all about its production capacity.

Write for bulletin giving fullest particulars.

BRISTOL MACHINE TOOL CO.
SUCCESSORS TO C. G. GARRIGUS MACH. CO.
BRISTOL, CONN.

If interested tear out this page and place with letters to be answered.

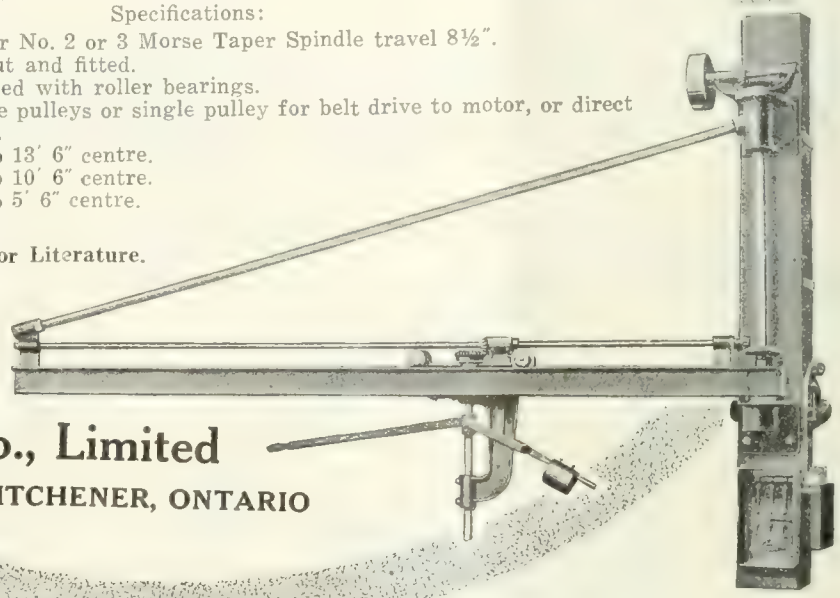
Built for Service

The Canadian Radial Drill is designed particularly for work in structural shops. For seaming and countersinking large surfaces such as structural shapes, boiler plates, long beams, etc.

Specifications:

Spindle 2 3/16″ diameter No. 2 or 3 Morse Taper Spindle travel 8½″.
All gears accurately cut and fitted.
Carriage wheels equipped with roller bearings.
14″ x 14″ tight and loose pulleys or single pulley for belt drive to motor, or direct connected to motor.
15 ft. Beam will drill to 13′ 6″ centre.
12 ft. Beam will drill to 10′ 6″ centre.
7 ft. Beam will drill to 5′ 6″ centre.

Write Dept. 16 for Literature.



Canadian Blower & Forge Co., Limited

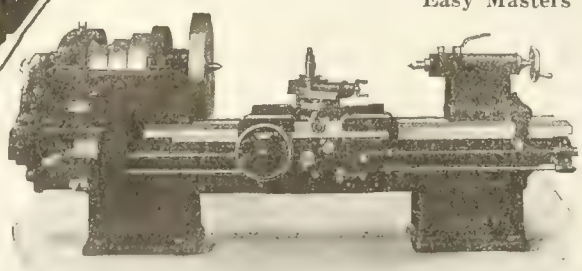
KITCHENER, ONTARIO

SIDNEY

Heavy Duty Lathes

The 25-inch Heavy Duty Quick Change Sidney shown below is the last word in lathe construction. Every possible improvement will be found in this late model. Bed lengths available are 10, 12, 14, 16, 18 and 20 feet. Also built with a 27-inch swing.

Easy Masters of Big Jobs



Regardless of the severity of work, dependence put on Sidney Lathes has never been misplaced. The Sidney line has made good—with a vengeance. New Bulletin just issued on 25-inch machine. Write to-day!

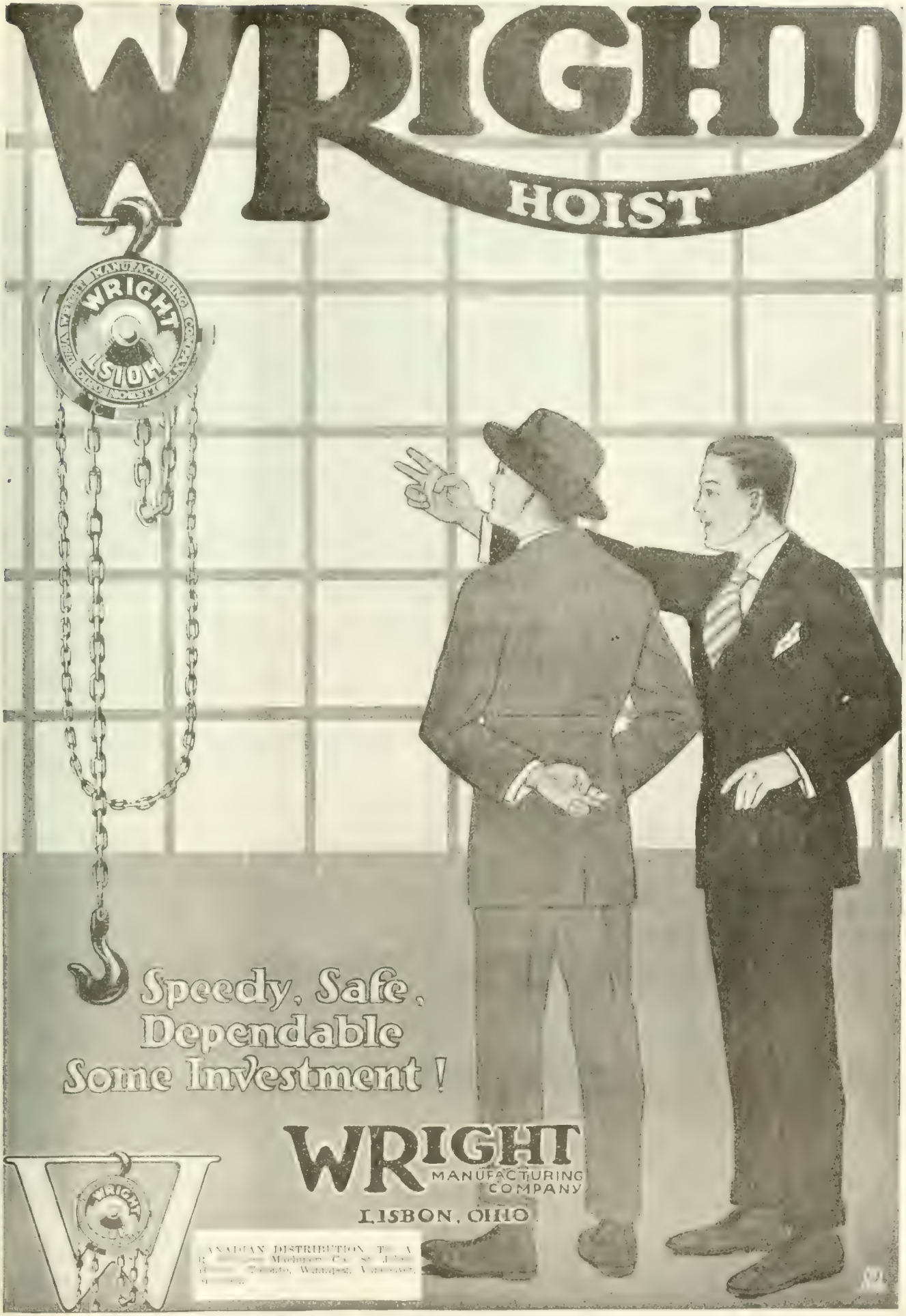
For SERVICE

The Sidney Tool Company

SIDNEY, OHIO

CANADIAN AGENTS:
Yeates Machinery & Supply Co., Montreal, Que.
H. W. Petrie, Limited, Toronto, Ontario

WRIGHT HOIST



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Customers Are Satisfied

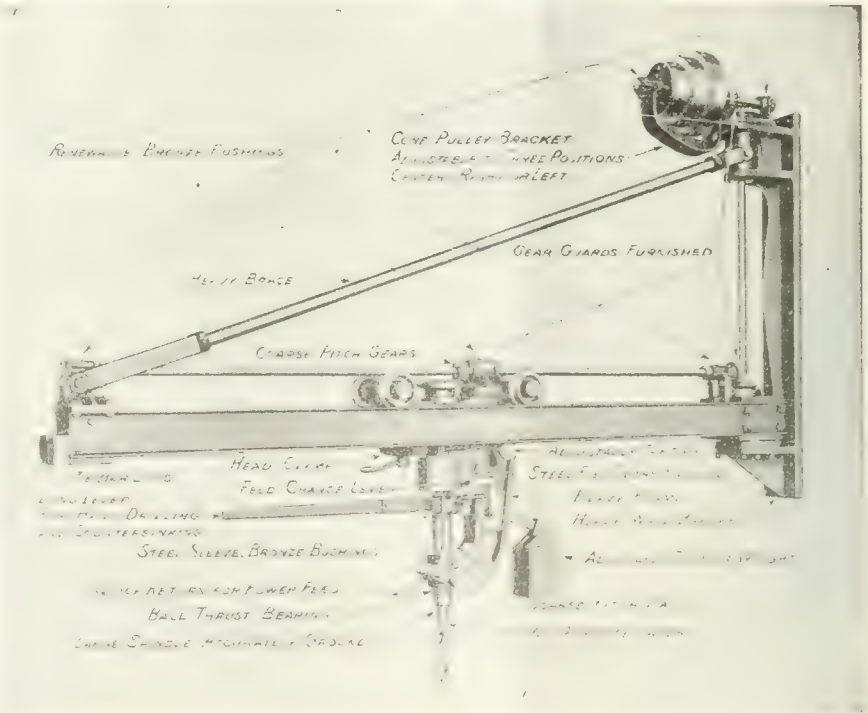
with the performance of this machine in their works. A recent letter to us states: "Regarding the WALL RADIAL DRILL, this is operating every day, and we are more than pleased with the results we are getting from the use of this tool. In all probability we will install additional ones later on." Our deliveries are getting further away each day. Better take advantage of the present conditions.

Want our detailed bulletin? You'll be interested in noting the construction of this machine, as given in same.

MADE IN FOUR STANDARD SIZES.

Rated size	Drills to centre of	Wall to end of arm
7 ft.	14 ft. circle	10 ft.
9 ft.	18 ft. circle	12 ft.
11 ft.	22 ft. circle	14 ft.
13 ft.	26 ft. circle	16 ft.

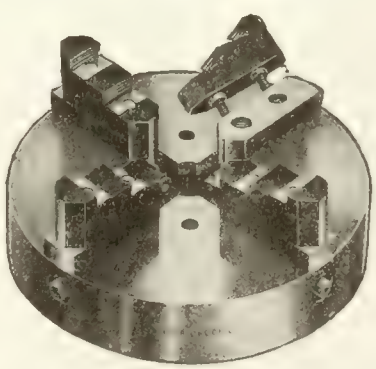
F.O.B. Boston, Mass.



LYND-FARQUHAR COMPANY

419-425 Atlantic Avenue Dept. B **BOSTON, MASS.**

SKINNER
Geared Screw Chucks
3 or 4 Jaws as Preferred



These chucks can be operated either independently or universally as desired. The jaws are easily reversed by simply loosening the jaw screws—turning the upper section and tightening the screws again.
Powerful, accurate, easy to operate and adjust, these chucks are adaptable to many classes of work.

The Skinner Chuck Company
New Britain, Conn.

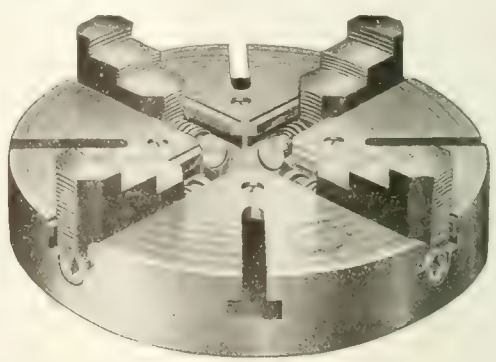
N. Y. Office
94 Reade St.

San Francisco Office
Rialto Building

London Office
139 Queen Victoria St., London, E.C. 4

ALL STEEL
INDEPENDENT CHUCKS

are not an experiment—they have come to stay. They are a necessity with the modern machinery and high-speed steel cutting tools.



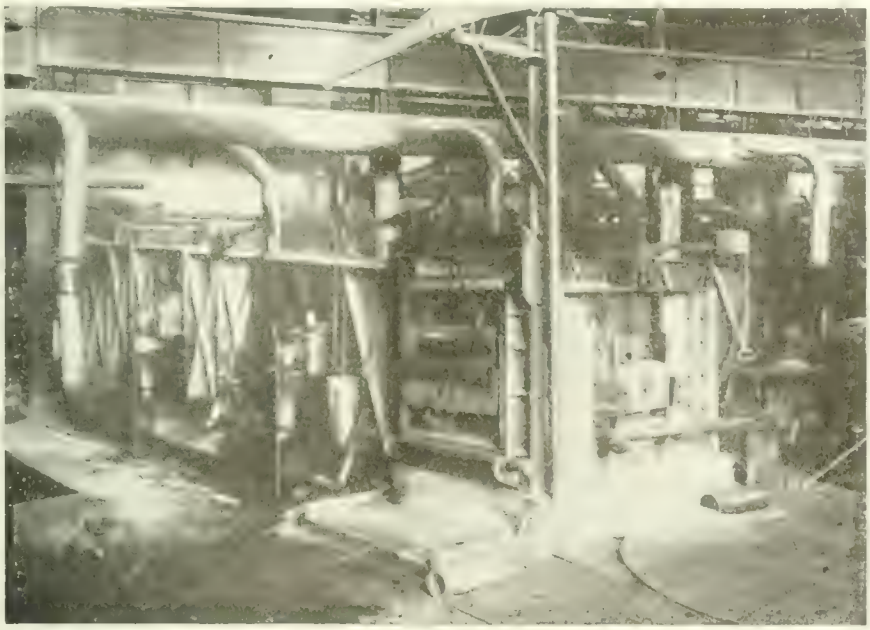
THE UNION STEEL BODY CHUCKS
are well designed and have all the elements of strength and durability for which they are designed. We make other types in steel also, including the Geared Scroll Chucks and the Geared Scroll Combination—all designed for heavy work and hard usage.

UNION MANUFACTURING COMPANY
New York Office:
26 Cortland Street, New Britain, Conn.
Makers of a complete line of chucks

If what you need is not advertised, consult our Buyers' Directory and write advertisers listed under proper heading.

Another MECOL Furnace

demonstrated its superior features point by point to a group of men whose years of experience in the heat-treatment of metals made them appreciative judges. We refer to the "Mecol" Furnace shown in this illustration, installed at the Pointe St. Charles Works of the Canadian Steel Foundries, Limited.



Our intimate knowledge of heat-treating methods, and our long experience in the building of efficient furnaces fit us to give helpful advice—and that we will do promptly if you

Write

Mechanical Engineering
Company, Limited
Room 308, Bank of Toronto Bldg., Montreal
Three Rivers, Quebec, Canada

H & G

Die Head Cuts
Perfect Threads

The H. & G. Die Head illustrated is only 3⅝" outside diameter, yet it will cut from the smallest up to 1" standard thread and up to 1⅛" fine threads. For absolute proof of its ability to stand up and give good results, see the perfect threads it cuts on nickel steel. You can see these many places, but in almost any automobile or areoplane plant for certainty.

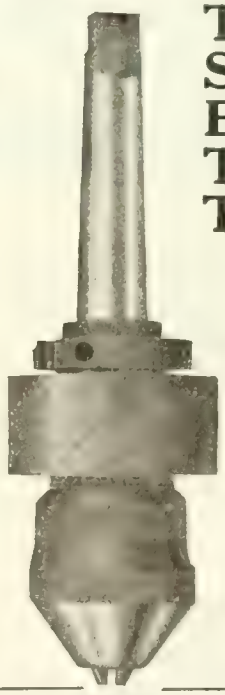
Made in 9/16", 1", 1½" and 2" sizes.

No stronger, more durable, more accurate Die Head was ever made.

on Nickel Steel

Ask for Catalog

Eastern Machine Screw Corp.
New Haven - Conn.



The Saving Slip of the Bicknell-Thomas Tap Chuck

is its most important feature. Powerful enough to drive the tap under all ordinary conditions, the friction slips before enough strain can develop to break it. Compact — invaluable on multiple spindle machines. Adaptable — ideal for tapping blind holes.

Made in four sizes—from ⅛ to 1 inch taps. Straight or Morse taper shanks.

Let us send the Circular

BICKNELL-THOMAS COMPANY
GREENFIELD, MASS.

Chicago Representative: H. S. Huncke, 15 N. Jefferson St. Pacific Coast Representatives: The Chas. A. Dowd Sales Co., 329 Market St., San Francisco. Foreign Agents, Canada: The Jas. Buckley Co., St. Nicholas Bldg., Montreal. England: Goodchild & Partners, Ltd., London, W.C. 1.

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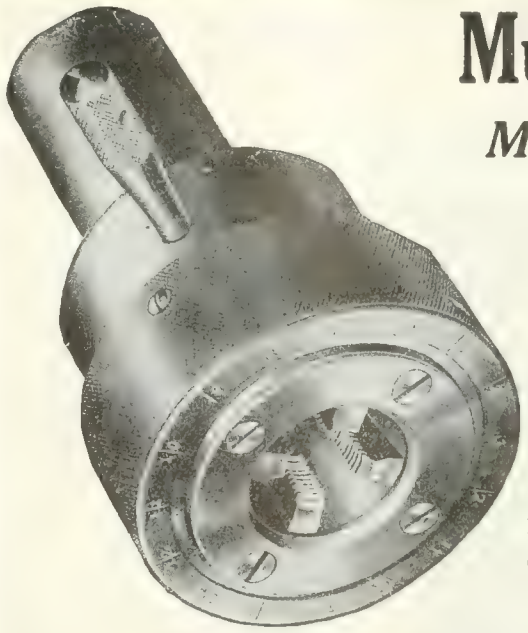
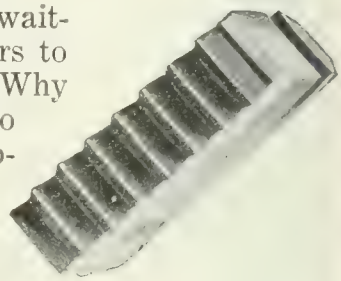


Murchey Chasers

Mean Quick Deliveries

Murchey Tools will cut your tapping and threading costs. **They will boost production 50%.** Another important feature is Murchey's **Quick Deliveries on Chasers.** This is a Murchey specialty. No waiting! We get your chasers to you when you want them. Why not use Murchey Tools to speed up your threading production?



Send for a Murchey Tap or Die on approval and give it a trial. You will then secure actual proof of its value to you.

Murchey Machine & Tool Company, Detroit, Mich.

THE COATS MACHINE TOOL CO., Caxton House, Westminster, London, England, Glasgow, Newcastle-on-Tyne,
FENWICK FRERES AND CO., 15 Rue Fenelon, Paris, France

CUSHMAN

We've been Manufacturing

Nothing but Chucks and Their Accessories

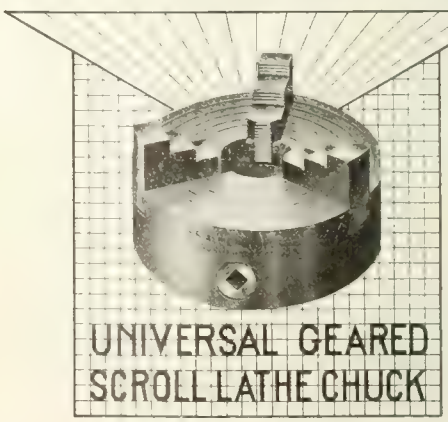
FOR NEARLY 60 YEARS

AND OUR PRODUCTS SHOW IT

Years of experience in using our tools has convinced manufacturers that the word "Cushman" stamped upon a chuck is a guarantee of its quality and efficiency.

Let us send you our catalogue.
Cushman Chuck Co., Hartford, Conn., U.S.A.

ALMOND



The body is a one-piece casting which eliminates parts and chattering when under heavy cutting pressure. The jaws are made of special alloy steel and hardened through making them stronger than the usual case hardened jaws. Two styles jaws—No. 1 Common Jaws, No. 2 Rervers Jaws.

OTHER ALMOND PRODUCTS

Drill Chucks, Right Angle Transmission Micrometer Calipers, Flexible Steel Tubing.

T. R. ALMOND Mfg., Co.

Ashburnam, Mass.

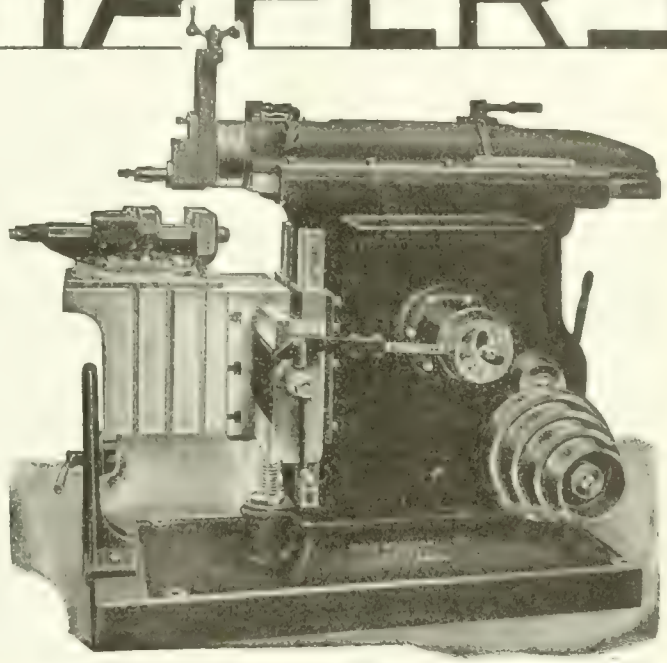
McDougall SHAPERS

Rigidity Plus

Simple Design and Convenience of Adjustments

give operator every facility for ease of operation and Accuracy in Production

Our circulars, containing complete specifications and descriptions, are ready. Write us for one.



The R. McDougall Co., Limited
GALT, ONTARIO

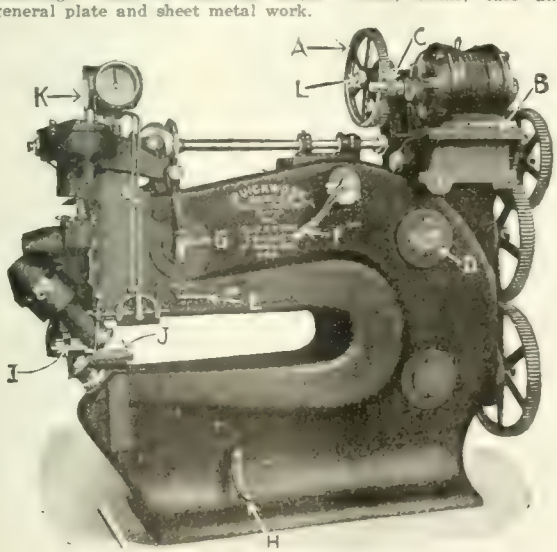
THE CANADIAN FAIRBANKS-MORSE CO., LIMITED
Sales Agents

"QUICKWORK"
Registered in U.S. and Foreign Countries.

ROTARY SHEARS

MADE IN 7 SIZES.

Cut all gauges of sheet and plate metal up to 1 inch thick in straight or irregular shapes and openings without cutting in from side of sheet. Leaves square, true edge that requires no finishing. Used in building ships, boilers, tanks, cars and general plate and sheet metal work.



Patented June 3rd 1913

SAVES 50% TO 90%
Eliminates Oxyacetylene Cutting and Plate Planing.
Write for Catalogue No. 60.

THE QUICKWORK COMPANY, ST. MARYS, OHIO, U. S. A.
Cable address: "QUICKWORK."
Codes: W. U. and General.

YALE BRAND

Hand Cut Steel Letters and Figures

The cutting and tempering make or spoil a stamp. Ours are correctly shaped and properly tempered.

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WHEN Electric Welding came into general use, another interesting grinding operation was presented to the wheel manufacturer. Back in 1897 when this process was first introduced, the difficulty of removing the rough burrs left when two pieces of metal were welded together was greater than it is to-day.

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From the above illustrations and many others of a similar nature it is noted that in the majority of cases where trials were conducted on grinding of this kind the operator discovered that he was using a wheel that was too soft and in some instances too fine. From these observations, if you are doing this kind of grinding and the results are not what you think they should be, if you will write to the Norton Sales Engineering Departments stating the kind of grinding and conditions surrounding your work they will be glad to render what assistance they can in helping to solve your problems.

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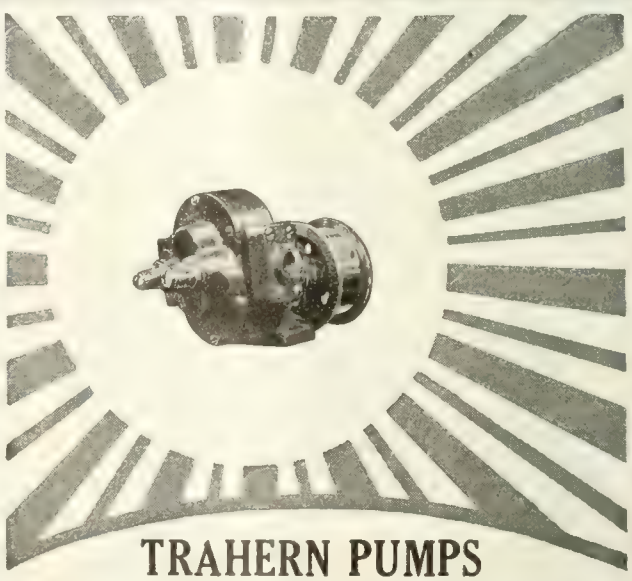

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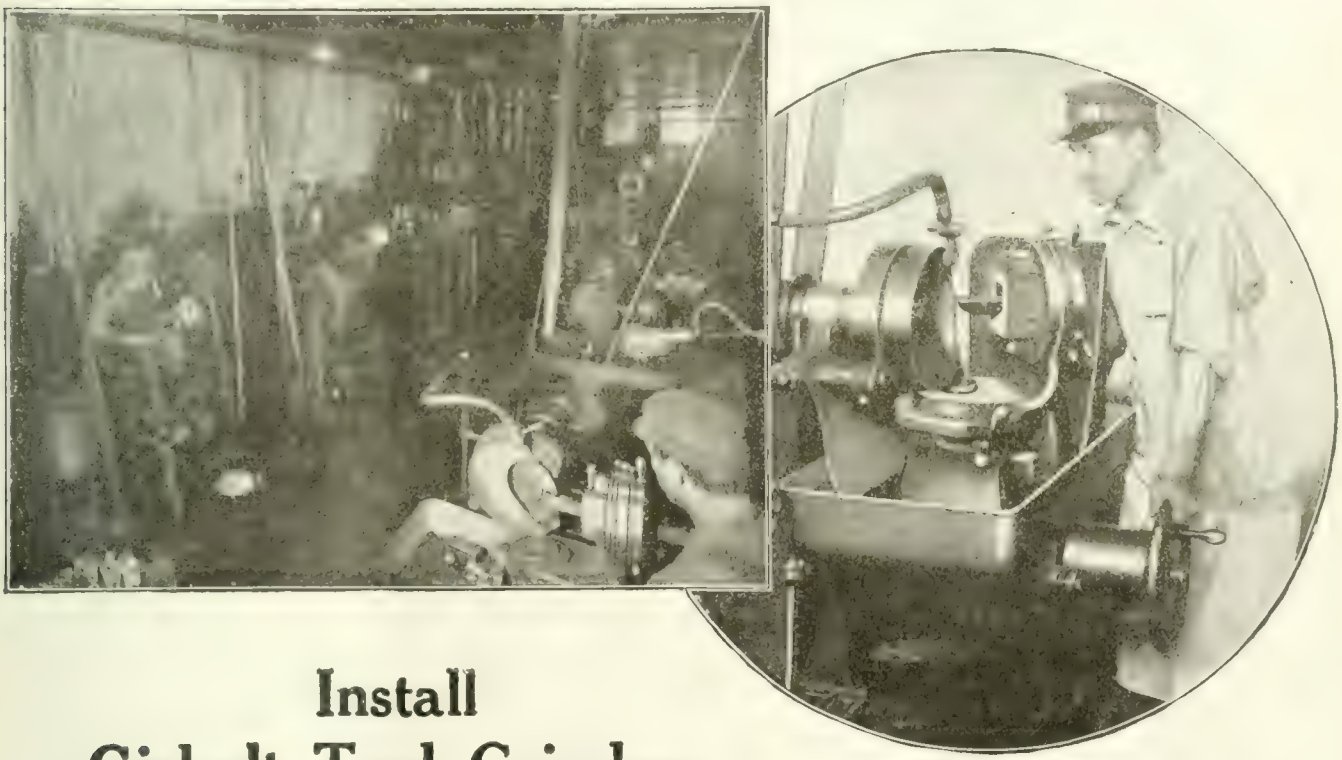

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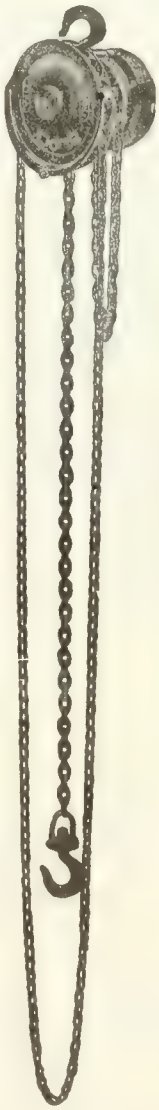

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CANADIAN MACHINERY AND MANUFACTURING NEWS

Vol. XXI No. 16 October 23, 1919

A Discussion of the Various Types of Jigs

The Second and Last Portion on This Subject. As Before Stated, There is Generally a Fundamental Principle Involved in Jig Design, Which is Varied to Suit the Requirements

By ROBERT MAWSON

THE illustration, Fig. 1, shows a type of simple, single clamp jig. The knurled head pin A is made with a thread which screws into the body of the jig. When placing the part to be machined in the jig the screw is therefore first removed. After this has been done the clamp B may be removed.

The part C is then placed into the tool, being located by the pin, as shown. The clamp is next placed over the piece, being located for position by means of the pin D.

The other edge of the clamp rests against the steel block E.

The piece then sets between the front edge of the clamp and the wall F.

The screw A being then tightened forces the clamp down, and this action holds the part between the two surfaces noted. It will be noticed that the rear —left end—of the clamp is made with a raised portion or heel, and as the forward end is made slightly tapered in a vertical direction, the simple action of tightening the screw forces it down and therefore the clamp performs the dual purpose of positioning the piece and also holding it securely in the jig.

It is obvious that the hole in the clamp must be made slightly larger than the body size of the screw to allow the clamp to rock.

Three holes are then drilled in the element, the drill being guided through the holes shown at G, the tool resting with its rear vertical surface on the machine table.

Positive Location Type

It will be readily conceded that when positive locations for the piece can be used there is less chance of error than where the locating depends on the operator. The photo, Fig. 2, shows an open type-positive location jig.

The casting machined in the tool has been previously bored and a slot milled in the centre of a machined face.

The piece is therefore placed on a plug A, which accurately fits the bored hole and is also located by a tongue B, which also fits the machined keyway.

The four hook bolts C are then turned with their heads over the casting and the jig reversed to the position shown in Fig. 3.

The thumb nuts A are then tightened by the operator, which pulls up the casting securely into the jig.

The various holes may be then machined, the tools being guided through the various bushings shown in the usual manner. Legs are provided, the purpose of which has been previously noted.

This type of jig gives excellent results, as it is quick acting, positive and therefore produces accurate, interchangeable parts.

The next illustration, Fig. 7, shows another positive location jig of a somewhat different design.

This casting is again located by a circular plug A and key B, these elements fitting into surfaces which have been accurately machined in previous operations. The open washer C is then slid over the screw, as shown, which is then tightened down.

The small clamp D is then turned to the position it occupies in the photo and the small screw being tightened against the clamp assists in holding the casting.

Holes are then machined in the piece, the jig being turned into four positions, the one shown, the front face on the table, the left side resting on the machine table for the third position, and the right side for the fourth drilling operation.

Simple Holding Jigs

It is sometimes advisable to provide a medium for simply holding a part to be drilled.

This may be the case where a casting is somewhat fragile or of awkward shape.

In Fig. 4 is shown such a holding device, the tool being not provided with guide bushings for the drilling operations. The casting is located on a pin which fits into a reamed hole A, which has been previously machined.

The casting is then revolved on this stud until the piece comes in contact with the pin B. The strap C, which is of the open-ended type, is then fastened onto the casting by means of the long setscrew shown.

It will be noticed that when the casting has been located and held in the manner described, all the various bosses rest on supports.

The operator then centre-punches these bosses and drills a hole in each.

By the use of such a simple holding device the casting is held rigidly for the drilling operation, which may therefore be performed more quickly and satisfactorily.

The next tool, Fig. 11, is also a holding jig, but is provided with guide bushings. In reality it is the second operation on the casting previously shown.

The piece is again located on a pin A. The screws B are then tightened until the casting is central between the guide bushings.

This can be readily done, as by tightening one more than the other the casting will oscillate on the pin until the desired position is obtained. The open washer is then fastened against the casting by means of the screw in the pin A, which holds the piece securely in the jig.

The various holes are then drilled and the guide bushings may be observed immediately above the bosses.

Tools of this nature, where no guide bushings are used, or where the casting may be revolved to suit the condition of the casting, are permissible where the holes machined are of an independent nature, or in other words, when their position is not relative to other elements on the machine or design.

Jig With Holding Handle

The illustration, Fig. 5, shows a handy type of jig, fitted with a handle

which affords a convenient medium for holding during the machining operation.

When placing the piece in the jig, the cover A is first raised, the projection at the end providing a handy hold for the fingers. To raise the cover the knurled head pin B is first pulled out.

The casting is located by means of pins, the knurled headscrew C forcing the piece back against the locating pins. The screw is placed at a slight angle, so that the pressure forces the piece both into the jig and also back against the pins.

The cover is afterwards dropped down and held with the knurled head pin A. Holes are then drilled in the piece, the jig being placed in the position shown and then turned over with the rear face resting on the machine table.

It will be noticed that the jig is provided with narrow bearing surfaces on both faces, which rest on the machine table.

This is an advantage, as it reduces the possibility of dirt or chips getting under the faces, which would thus prevent accurate drilling.

The interesting feature of this tool is the machine steel handle E, which is forced into the body of the jig.

This attachment provides a handy medium for manipulating the tool to the various drilling positions.

The photo, Fig. 8, shows a jig with a wedge pin for locating the piece.

To use the tool the knurled head pin A is first slid out, and the piece pushed in from the front.

The casting then rests on the height pin B, which also acts as fulcrum.

The knurled head pin is then inserted again, fitting into a reamed hole in the arm C. It will be observed that the upper surface of the pin is machined with a flat surface, this being also made at a slight angle. As the operator therefore pushes in the pin the inclined surface acts as a wedge and raises the casting into the locating vee block D.

This simple angle device not only raises the casting, but its position or distance which it may be pushed in accommodates any slight discrepancy on the outside diameter of the piece.

The jig is made with an inserted steel guide plate E, which permits the making of the tool to be much simplified.

The guide hole for the drill on the upper surface on guide plate may be noticed by referring to the illustration.

A Triple Angle Jig

The next example, Fig. 9, shows a triple angle jig with a positive location. The casting is placed into the jig after the latch A has been raised.

The piece is located by a tongue B, which accurately fits into a slot which has been previously machined. The latch is then dropped down and the screw C

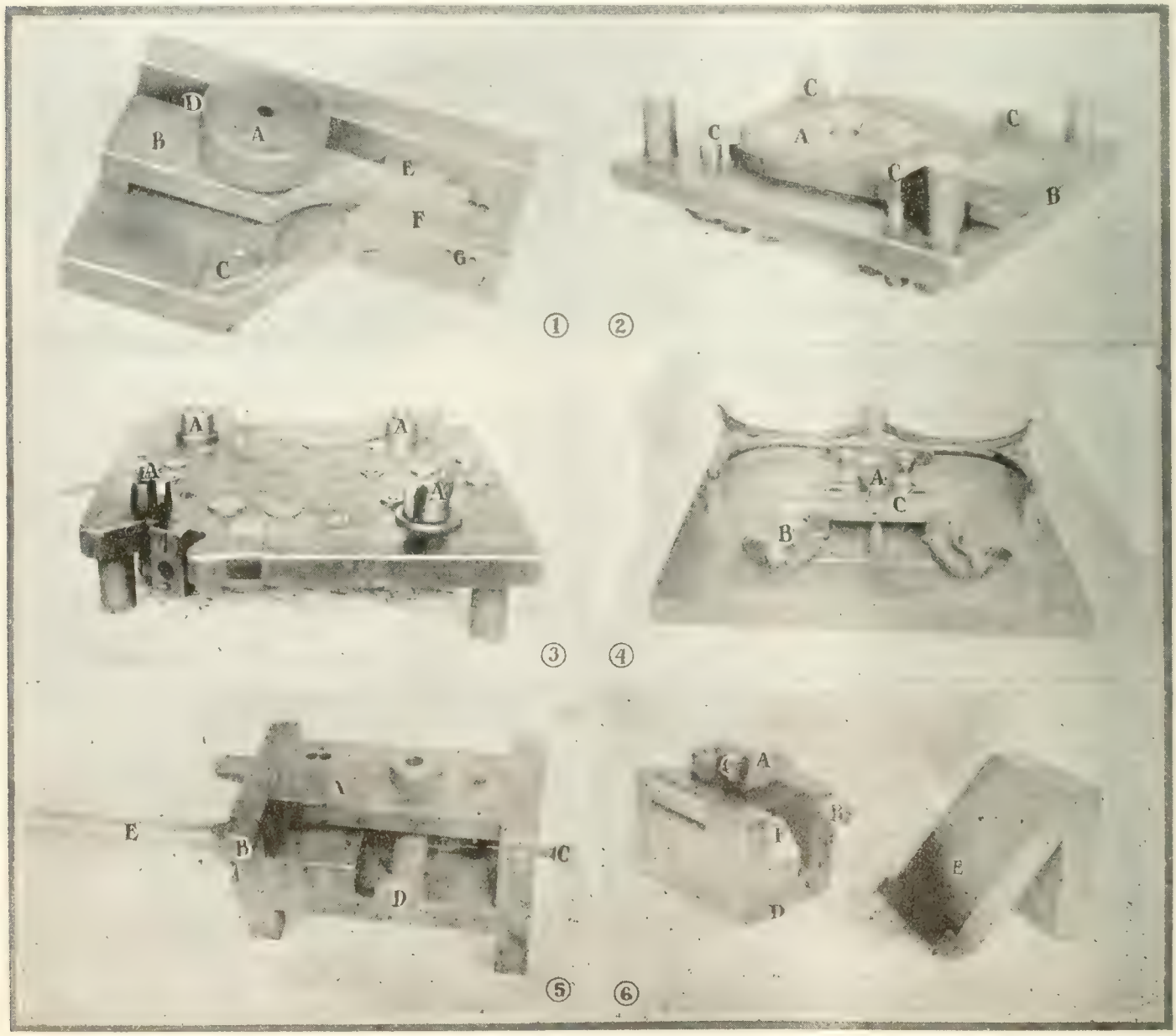


FIG. 1. SIMPLE CLAMP JIG
FIG. 3.—OPEN TYPE POSITIVE LOCATION JIG, TOP VIEW.
FIG. 5. JIG FOR HOLDING HANDLE.

FIG. 2.—OPEN TYPE POSITIVE LOCATION JIG, BOTTOM VIEW.
FIG. 4.—SIMPLE HOLDING JIG.
FIG. 6.—JIG WTH SEPARATE ANGLE BLOCK.

tightened against the piece, either by using a wrench or screwdriver.

It will be seen that this screw is placed at an angle with the base of the casting and when tightened the pressure both forces the piece back to a stop pin and also down onto the locating key.

In this tool holes are to be drilled at three different angles, the three surfaces D are therefore made with similar angles to obtain this result, these surfaces or bases resting on the machine table when drilling the holes in the guide plate opposite.

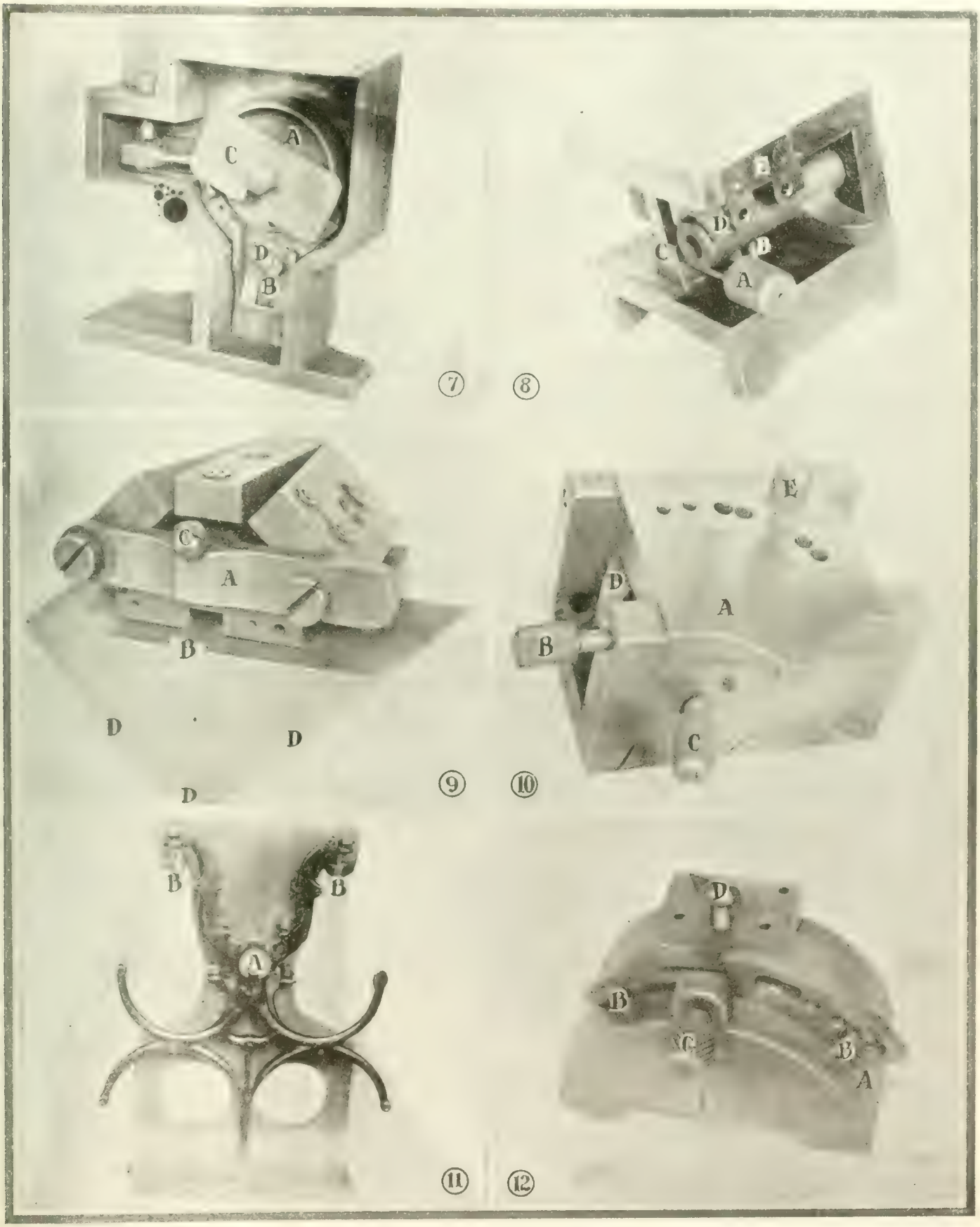


FIG. 7.—POSITIVE LOCATION JIG.
FIG. 9—TRIPLE ANGLE JIG.
FIG. 11. HOLDING JIG WITH BUSHINGS

FIG. 8. WEDGE OPERATED JIG
FIG. 10.—BOX TYPE OF JIG.
FIG. 12 PROFILE TYPE OF JIG

The illustration, Fig. 10, shows a box type of jig.

To place the piece into the jig the cover A is first raised by sliding out the knurled head pin B.

The piece is then put in the jig and the cover dropped down and fastened with the pin.

The knurled headscrew C is then tightened against the piece which pushes it against the stop plate D.

The screw E is next tightened onto the piece to hold it securely in the jig and also against the drill pressure.

The various holes are then machined in the usual manner.

A few words might be added about box jigs. It is advisable not to use them whenever possible for the following reasons:

They are usually more expensive to make, they are also much more difficult to keep clear of chips, and again, owing to the fact that the piece being drilled is out of sight, it is easier to make a mistake during the machining operation as the man cannot observe the progress of the work. When it is found absolutely necessary to make this type of tool, the question of expense must be controlled by the best design.

Chips may be removed in a small jig by plunging it after each drilling into a pail of kerosene, and mistakes in drilling can be only avoided by vigilance of the operator.

On a large jig holes to permit the chips and dirt to fall away from the locating surfaces should be always provided.

Jig With Separate Angle Block

When designing a jig for machining holes which are not in the same plane, it is often a problem to the designer whether to make the bases at the desired angle (as has been already illustrated) or use a separate angular block.

The practice of making a separate block will be usually found to be cheaper, as the main jig can be designed much simpler. The illustration, Fig. 11, shows a jig which has been made with a separate block or angle.

The casting is dropped into the jig after the cover A has been raised, and located against stop pins.

The cover is then fastened down by means of the knurled head pin B.

Holes are afterwards drilled in the piece, the drill being guided through the bushings C. The jig is then placed with the surface D resting on the face E of the angular block. It will be observed that this element is made with a ledge at the lower edge to prevent the jig sliding away from the block.

When the jig is in this position, the surface F is horizontal, so that a hole may be drilled in the casting, the bushing may be seen in the surface noted.

Fig. 12 shows a jig made with a profile surface to suit the contour of the piece to be machined.

This profile slot is made only part way around the jig, the blind end acting as a stop.

The piece is slid in from the left-hand end until it comes against the end A. The upper part of the piece also rests against the two pins B. The knurled headscrew C and wingscrew D are then tightened onto the piece to hold it securely in the jig. Holes are then drilled in the usual manner.

In this article I have endeavored to show some of the leading types of jigs used and analyze their features. I can only hope that it will be useful for not only the designer, but also the small shop, where tools are just made, often without any idea as to why things are done one way and not by a different method.

The Fundamental Principles of Safeguarding

A Paper Presented Before the A.B.C. Session, Eighth Annual Safety Congress, Cleveland, on the Subject of What Shall I Guard and How Shall I Guard It

By SIDNEY J. WILLIAMS, Secretary and Chief Engineer of the National Safety Council, Chicago

THE first half of our subject is, What shall I guard? The second half is, How shall I guard it?

If you want your plant to be 100 per cent. safe, the answer to the first question is, Guard every moving part, wherever located, on which a workman might be injured if he came in contact with it in any way, or from any cause whatsoever. If the moving part is in a place "where nobody ever goes," remember that someone is likely to go there sooner or later, in connection with the repair or maintenance or alteration or the machinery itself or of the building, or for some other reason which you cannot anticipate. You probably have heard the classic story—a perfectly true story—of the man whose heel was cut off by an unguarded gear 14 inches below the ceiling. The man was standing on a scaffold, working on another shaft nearby; to brace himself he placed his foot against the shaft on which the unguarded gear was located, his foot slipped, and was caught in the gear. Many similar examples could be quoted of accidents occurring in out-of-the-way places. Recognizing this fact, the Illinois Steel Company rule book, to mention only one example, requires that all gears, wherever located, must be enclosed.

You may be puzzled by attempting to apply this principle to the guarding of overhead shafting and belts. Many shafts contain miles of overhead shafting, which it is almost a physical impossibility to guard. On the other hand, oilers and repairmen are frequently injured, sometimes fatally, on unguarded overhead shafting or belts. The only solution is, if the shafting positively cannot be guarded, to prohibit absolutely any work on such overhead transmission while it is in motion. Repair work, shortening of belts, etc., can be done during the noon hour or at night; oiling likewise—or, better still, install automatic oilers or oilers which can be filled from the floor by using a special oil can with long spout.

A gear or belt or other dangerous moving part which happens to be located below a table, or in some other place where it is partially hidden, is not thereby made safe. Someone occasionally must reach under the table to sweep or repair the floor or oil or repair the machine. Someone may slip or stumble so that his arm comes in contact with a gear or belt which would be safe for the workman standing in his normal position. The immigrant totally ignorant of machinery—and it is hard for us to realize the completeness of the ignorance on this subject, on the part of foreigners brought up in farming districts—may deliberately put his hand or his finger into an opening that looks interesting, just to see what it is. If he finds that "it" is an unguarded gear, it is easy to say that the accident is his own fault—but that does not relieve our obligation to pay his compensation, nor does it restore him to his vacant place in the gang.

What I have said of gears and belts applies equally to any moving part on which a man might be injured—counterweights, cranks, reciprocating parts such as a planer bed, and so on; also, of course, to the operating point of machines.

The second half of the problem is, as already stated, "How shall I guard it?" Here are a few points to remember:

1. A safeguard should be so designed and constructed that it will prevent all accidents on the part guarded—not only accidents to the operator while at his regular work, but also to the operator or passers-by in case they slip or fall, or carelessly touch the machine.

2. The guard should not interfere with production. If it does, it is liable to be taken off. In designing a guard it is generally wise to consult the man who will use it.

3. In general, the guard should be attached to the machine and not to the floor; if attached to the floor, use a connection which will interfere as little as possible.

4. The guarded part must be accessible for oiling, inspection, and repair. The door or removable section provided for this purpose should be hinged or otherwise attached to the remainder of the guard, or to the machine. If not, it is likely to be left off permanently.

5. The guard should not interfere with cleaning and sweeping around the machine. It should, therefore, be kept generally about six inches above the floor.

6. The guard should be strong enough to resist injury and keep its shape. A light, flimsy guard soon becomes bent and is discarded. A substantial guard is cheaper in the end.

7. Incombustible guards are preferred. Wooden guards, soaked with oil, may become a serious fire hazard. Metal guards are neater and wear much better. "Metal guards look as if you wanted to; wooden guards look as if you had to." Guards may be made of cast iron, sheet metal, wire mesh, expanded or perforated metal, or slats. Where subjected to acid or fumes, wooden guards may be necessary.

8. It is desirable to interlock the guard with the operating mechanism, where possible, so the machine cannot be operated unless the guard is in place.

9. A safeguard can often be so designed that it will also serve to prevent wear on the parts guarded—for example, a solid gear enclosure.

Let us consider the application of these suggestions to the design of gear guards. Cast iron guards are preferred because they may be made to fit more snugly, present a better appearance, and protect the gears from dust and injury. In shops having similar gears on several machines, the cost of patterns and cast iron guards will be no greater than the cost of "built-up" guards. A cast guard of one machine may be used as a pattern for making guards for similar machines.

Guards for a variety of machines, and in many sizes, may be more cheaply made of sheet metal. In large guards, an angle iron is used to make the joint between the flat sides and the curved part of the guard. In smaller guards this joint may be made by cutting projections (like saw teeth) on each side piece and bending these over to form a smooth curve. The joint may then be made either by spot welding or by riveting. Short pieces of angle iron may also be used to form the joint—about ¾ in. x ¾ in. x ⅛ in. angles, one inch long, 3 in. or 4 in. apart.

Gears should be completely encased; or where this is impracticable, should have a band guard with side flanges extending inward beyond the root of the teeth. If there is a spoke hazard, the gear should be completely enclosed, or filled in between the spokes.

Bolts, flywheels, shafting, and large gears are often guarded by an openwork, rather than a solid enclosure. Such guards should be so designed that no one can get his hand or his finger into the danger point even if he tries. If the guard comes within four inches of any danger point the opening should not be greater than one-half inch square, which is small enough to exclude fingers. If more than four inches away—which is about the maximum length of a man's finger—the openings may be larger than one-half inch, but not larger than two inches square, this being small enough to keep out a man's hand. If a slatted construction is used, the slats should not be more than one inch apart.

The safety engineer's greatest difficulty is in guarding machines on which men are working. Let me repeat that it is very important not to attempt to guard machines in a way which will interfere with production. The great majority of both foremen and workmen will seriously object to such a guard, will use it under protest, and when the opportunity arises they will take it off and not put it back. I have time to mention only two examples—the circular saw and the punch press.

A guard is not the only essential for safety in operating a circular saw. For ripping, it is very important that the saw be provided with a splitter. Keeping the saw sharp and properly set will greatly decrease the danger of throwbacks. The floor where the operator stands should have a nonslip surface.

Many shop men say that it is impossible to guard a circular saw without interfering seriously with operation. The safety rule book of a large company contains a similar statement. In a great majority of the woodworking shops which I have visited, some, at least, of the saws have not been guarded, or some of the guards have not been in use.

I remember, however, two woodworking shops where every saw was guarded and every guard was in use—the Westinghouse Electric and Manufacturing Company, at Pittsburgh, and the Commonwealth Steel Company at Granite City. There doubtless are others, but I do not happen to have seen them. In each of these two shops every circular saw was provided with a guard which completely covered it when not in use and which rose automatically from the table as the stock was inserted. I watched men operating these saws and the guards did not seem to introduce the slightest difficulty. They were of very light construction and when the stock was shoved in they rose without apparent effort—the larger ones, at least, being counterweighted. The men in charge of these departments told me that the guards did not interfere at all with production, and, in fact, that the men now would not work without them because they felt that they were so much safer. I do not blame the workman or the foreman who objects to using a cumbersome, heavy, non-adjustable guard.

Special work on circular saws sometimes is difficult to guard. In some cases these difficulties may be overcome by careful study. In a few cases they probably can not, and the guard must be temporarily laid aside, being hinged or pivoted for that purpose. Where this must be done, another safeguard can often be introduced. For example, in grooving the edge of a board, provide an auxiliary guide or fence, so that there will be a guard on each side of the saw, thus keeping hands away from contact with it.

The punch press—using that common term to include all kinds of power presses—has, with the circular saw, the doubtful honor of causing more injuries, and especially more permanent injuries, than any other kind of machine. Where possible, the best guard is an enclosure around the plunger, which makes it impossible to get one's fingers underneath. Often, however, this is impossible. In such a case, let me suggest that instead of buying a dozen or a hundred of some so-called safety device, and putting it on every punch press in the shop, you start with one individual press and study the operation carefully in co-operation with the superintendent, foreman, master mechanic, and operator of the machine. Ask yourself the question—why do accidents happen or why may they happen on this particular press? The answer will be that, for one reason or another, the operator finds it necessary or convenient to put his hand under the plunger—either regularly or occasionally. The way to make the operation safe, then, is to arrange it so that the operator need not and will not put his hand under the plunger. Some times this may be done by cutting away a portion of the dies, so that the operator can keep hold of a part of the piece being formed and still not be injured. Often it may be accomplished by introducing an automatic or a foot-operated kick out. This almost always increases production as well as safety. Sometimes it is found practicable and advantageous to interchange the upper and lower dies. Sometimes the method of operation may be altered; I have in mind one case where, in riveting the handle socket onto a kettle, the operator laid the rivets in position after the kettle was in the machine and sometimes the plunger came down and caught her finger. After a good deal of study the superintendent arranged to have another girl place the rivets in position and hand the kettle to the operator, who then placed it in the press and completed the operation, obviously without danger and obviously with a great saving in time as well. In a great many cases, where the same operation is continued for a long time on one press ,it will be found economical to provide some sort of automatic or semi-automatic feed; this also always increases production as well as remov-

Continued on page 415

Canadian Machinery Drafting Course, Part IV

In This, the Fourth Portion, We Start in on Six Problems on Geometrical Drawing. This Branch Will Not be Touched on More Than is Absolutely Necessary

By J. H. MOORE, Associate Editor Canadian Machinery

BEFORE going into this subject of geometrical drawing let us say that a groundwork on this subject is absolutely necessary, otherwise we would not take it up. We shall, however, confine the work to three plates, so that only the most important geometrical problems will be taken up. By this means the student will not tire of the subject, for the writer of this series knows from personal experience that the average machine shop apprentice hates the very name or look of this subject. Still in due justice to the course these points should be at least touched upon, so students in general must not forget the necessity of getting in this groundwork of three plates, after which a more interesting section will follow though not more important than this the first of the geometrical series. Above all keep up the good work. We are receiving replies galore so keep sending in your work and secure one of the three prizes given in each part of this course.

Geometrical Drawing

Geometrical drawing is the art of becoming acquainted with the various lines and figures, what particular properties these figures have, and what bearing they have on mechanical drawing. A working knowledge of the problem to be presented in this course is absolutely necessary to a good draftsman, and is, of course supplementary to the main idea, namely, mechanical drawing. As the main idea of geometrical drawing is accuracy, students must be sure to have all their drawings neat and accurate, otherwise the purpose of this section is lost.

In geometrical drawings we speak of definitions, which of course means an explanation of the various lines and figures involved in the study.

Geometrical Definitions

Let us see what these definitions are:

A point is used to mark a position and has neither length, breadth, nor thickness.

A line has length only. It is produced by the motion of a point.

A straight line is one that has the same direction throughout. In other words it is the shortest distance between any two points.

A curved line is one that constantly changes its direction. Sometimes it is termed a curve.

A broken line is one made up of several straight lines.

A horizontal line is one that has the direction of a line drawn upon the surface of water which is at rest. In other words a line parallel to the horizon.

Parallel lines are lines which lie in the same plane, and are equally distant from each other at all points.

A vertical line is one that lies in the direction of a cord suspended from its upper end, having a weight at its lower end. It is a line which is perpendicular to the horizon.

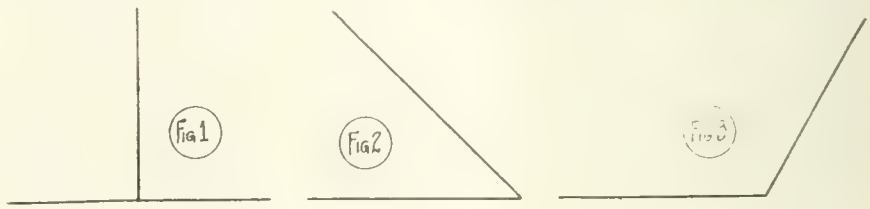
An oblique line is one that neither conforms to the vertical nor horizontal.

Examples of lines already spoken of are as follows:

Lines drawn with the T-square are all parallel to each other. A line drawn by means of the triangle on its straight side, together with the aid of T-square is a vertical line. A line drawn with the sloped side of triangle with same conditions as above will be an oblique line.

If two lines cut each other they are called intersecting lines, and the point where they cut is called the point of intersection.

An angle is the measure of the difference in direction of two lines. The lines are called sides and the point of meeting the vortex. The size of an angle is independent of the length of the lines.



If one straight line meets another, as in Fig. 1, so that the two angles thus formed are equal, the lines are termed perpendicular to each other, and the angles formed are known as right angles.

Should the angle be less than a right angle it looks like Fig. 2, and is termed an acute angle.

Should the angle be greater than a right angle it is termed an obtuse angle and appears as shown at Fig. 3.

Before going further into the other various definitions let us consider these already given as sufficient for the first portion on geometrical drawing. In this way the student will not have to carry in his head too many definitions at once, but will be able to concentrate on the particular ones he requires, so now to Fig. No. 4, and the instructions for the completion of the same.

Instructions

As usual commence by making the border lines 9 in. by 13 in., and the trimming lines 9½ in. by 13½ in. Divide this space into the seven parts as shown in the plate. As per usual, place the title, etc., in the lower space, then place problems 1 to 3 consecutively as illustrated. We will explain the working out of each problem as we go along.

Problem No. 1 (To Bisect a Straight Line)

To construct: First draw a straight line AB 3¾ inches long. With A as a centre, and a radius greater than one-half of the length of the line, describe an arc of a circle on each side of this line AB. With B as a centre and the same radius, describe arcs as before, intersecting the first two at the points C and D. Join C and D by the line CD, when the point E, when it intersects AB, will be the required point. In other words, AE=EB, as E is the middle point of AB.

This problem could also be termed erecting a perpendicular line to a straight line from its middle point, for the line CD is in the middle of AB and is perpendicular to it.

The next problems Nos. 2 and 3 can be classed under the one heading, namely to erect a perpendicular to a given line from a point in that line. We will take up two cases. First in Problem 2 we will take up the problem when the point is near the centre of the line.

Draw AB 3¾ inches long. Let C be the given point on the line. With C as a centre and any radius, such as CD, describe two short arcs cutting AB at the point D and E. With D and E as centres, and any convenient radius greater than CD, describe two arcs intersecting at F. Draw CF and that line will be perpendicular to AB at the point C.

In Problem 3 we take up a case where the point is near the end of the line.

Draw AB 3¾ inches long. Suppose C about ½ inch from the end of the line as shown. With any point D as a centre and a radius DC, describe an arc cutting AB at C and E. Draw ED and produce it until it intersects the arc at the point F. A line drawn through F and C will be perpendicular to AB at the point C.

Problem 4 (Through a Given Point, to Draw a Straight Line Parallel to a Given Straight Line)

First let AB be the given line 3 inches long. Let C be the given point

With C as a centre and any convenient radius, describe an arc DE intersecting AB at E. With E as a centre, and the same radius, describe the arc CF intersecting AB at F. With E as a centre and a radius equal to the chord of the arc CF, describe an arc intersecting DE at D. A straight line drawn through D and C will be parallel to AB.

Problem 5 (To Bisect a Given Angle Where the Sides Intersect Within the Limits of the Drawing

To construct. Let ABC be the angle to be bisected.

Draw the sides AB and BC 3¾ inches long. With B as a centre and any convenient radius describe the arc DE intersecting AB at D and BC at E. With D and E as centres, and a radius greater than the chord of half the arc DE, describe two arcs intersecting at F. A line drawn through F and B wil bisect the angle. In other words ABF will equal FBC.

Problem 6 (To Contruct an Angle Equal to a Given Angle)

Draw AB 2½ inches long, and the line BC 2½ inches long. The angle formed by these lines may be any convenient size; in this case we will call for 45 degrees. This angle ABC is the given angle.

Now draw DE a horizontal line 2½ inches long, and let D, the left-hand extremity, be the vortex of the angle to be constructed. With B as a centre for any convenient radius, say about 1½ inches, describe the arc FG, cutting both AB and BC. With D as a centre, and the same radius, draw the indefinite arc HJ. Now set the compass so that the distance equals the chord FG. With H as a centre and a radius equal to FG, draw an arc, cutting HJ at J. Through D and J draw a straight line. The angle JDE will now be equal to the angle ABC.

This completes the plate. Draw all these problems very carefully with a 4 or 6H pencil, making sure that the pencil is good and sharp. Draw your lines lightly, then, after completion, ink them in as shown on the plate. Students will do well to study and memorize these problems if possible. Above all get busy with this plate and send us along your work for inspection. Have you landed one of those scales yet? If not, this may be your lucky plate.

Tear off and send with drawing

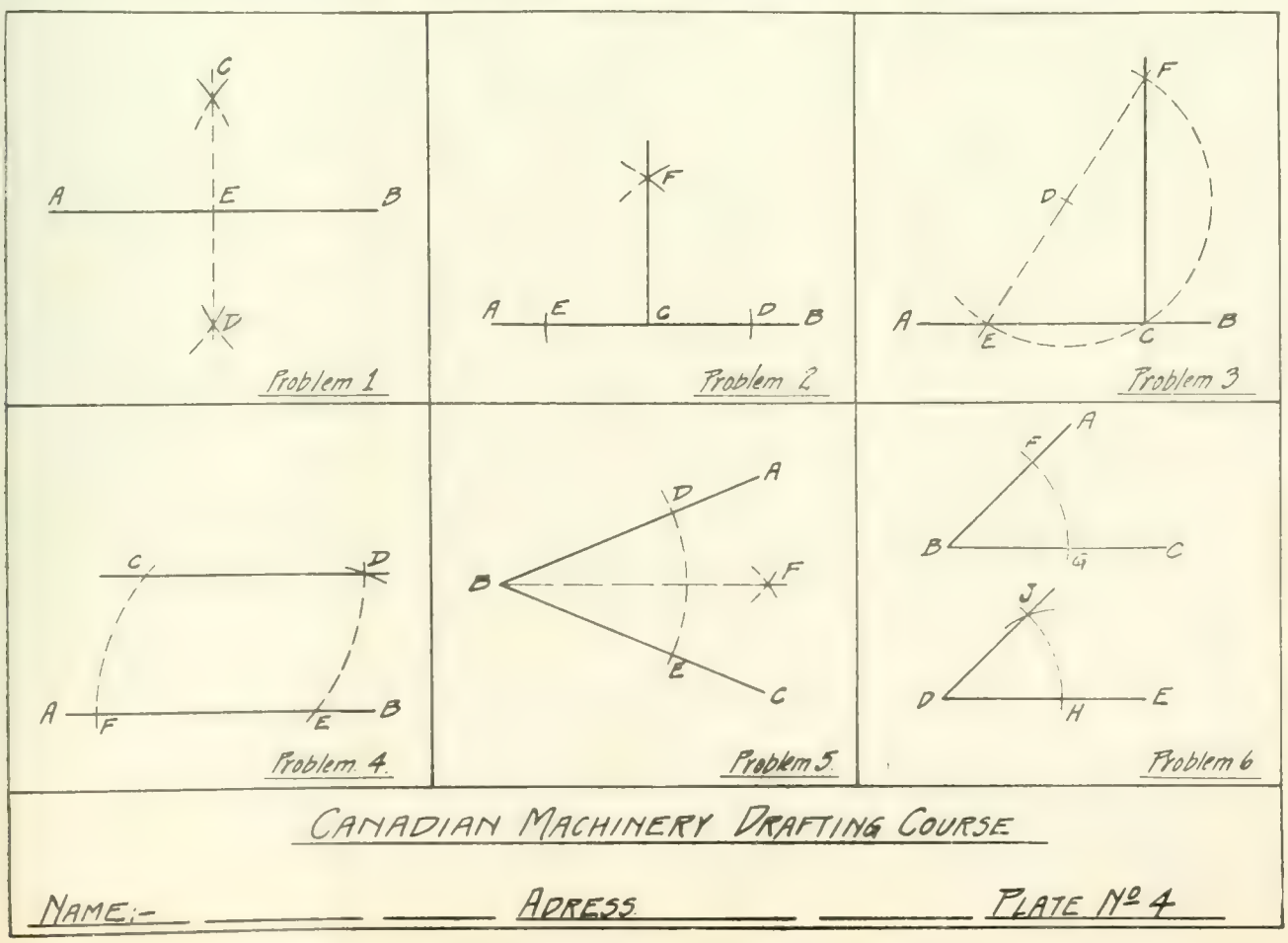
Name .....

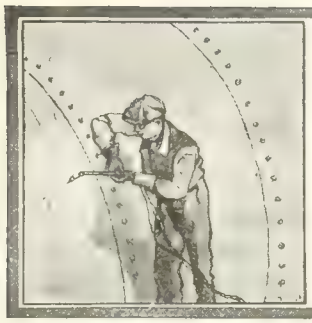
Address .....

Position .....

Firm's name.....

Arsenical poisoning by coal and coal products was recently discussed before the French Academy of Science by Charles Richet in a paper. There had been an outbreak of serious symptoms at a briquette works. The name given to the disorder was the pitch disease. In many cases there was cutaneous cancer of a grave form, which even proved fatal; about 30% of all the employees were affected in this way. A chemical analysis was made of the pitch, and arsenic was clearly found in it, and traces were also discovered in the dust at the works, in the hair of the workingmen (and that in considerable quantities) and in the blood of most of them. It was evident, therefore, that they were under the influence of arsenic. It was ascertained that similar results have been met among tar distillers, road asphalters, tarred paper makers, and lampblack makers. The origin of this arsenic is to be sought in the coal. It has been long known that certain varieties of coal contain notable quantities of arsenical pyrites; but it is a new thing to find that arsenic is so widely to be found in coal.





WELDING AND CUTTING

WELDING SCHOOLS, MOTOR TRANSPORT CORPS, U.S. ARMY†

By C. K. Bryce*

UNDER the expanded program of the Army one of the very noticeable shortages in the personnel of the Motor Transport Corps was that of oxy-acetylene welders. Welders were required in the Maintenance Divisions of this corps. In this division were two units that included welders—the Base Repair Shop units and the Machine Shop Truck units.

The Base Repair Shops were large shops of about 250,000 square feet of floor space, in which every operation in the rebuilding or repair of a motor vehicle could be carried on. Naturally, an important department was the welding shop. This was completely equipped with an acetylene generator, blowpipes, regulators and auxiliary devices, in accordance with latest practice. These shops were permanently erected and located in proportion to the motor vehicle requirements of the territory or troops to which they were attached.

The Machine Shop Truck units were essentially small machine shops on wheels. The principal truck had mounted on it a lathe, drill press, grinder and other tools for automobile repair and upkeep. In the equipment was included a complete oxy-acetylene welding and cutting outfit. Attached to the underside of the truck body were two oxygen cylinders and one acetylene cylinder. These mobile shops were used for minor or emergency repairs, which it was not practicable to put through the Base Repair Shops. Each army had a certain number of these units assigned to it.

On surveying the welding talent necessary to fill these units less than 100 welders were available. From the tables of organization it was estimated that between 1,500 and 2,000 would be required in six or eight months' time. The usual channels of draft, induction, enlistment and transfer from other Corps being discontinued, it was apparent a new source must be created.

In May, 1918, after considerable activity on the part of Col. J. W. Furlough, Deputy Chief, Motor Transport Corps, the organization of a welding school was started. This school was divided into three sections, to be located at each of the three Base Repairs Shops, then in process of erection in this country—namely, Camp Holabird, Md.; Camp Jessup, Ga., and Camp Normoyle, Texas.

Each school was laid out to accommodate a class of 100 welders, with provisions to increase this to 150. The buildings consisted of a school building proper, and an oxygen and acetylene house. The main building was divided into a welding room, lecture room, offices, stockroom, and repair shop.

The welding room consisted of rows of stations, piped with oxygen and acetylene from a central source. Each station occupied 7½ x 6½ feet of floor space, and consisted of a cast iron welding table, blowpipe, oxygen and acetylene regulators, hose, etc. The oxygen and acetylene were piped in headers between the rows of tables. Oxygen was distributed from a 30-cylinder manifold; acetylene was generated in a non-automatic generator at low pressure, and delivered to a 1,000-cu. ft. gas holder; from there it was compressed in a single stage compressor to about 10 lbs. pressure. After passing through suitable regulating and relieving devices the gas entered the station headers.

The course of training was from six to eight weeks' duration. The actual welding time averaged about 60 hours. In addition to this, there were about 30 hours of lectures and talks. A course of 60 standard problems, selected to cover the motor truck welding field, was selected. These problems covered steel, cast iron, malleable iron, aluminum, brass, bronze, copper, brazing and lead burning.

The students were compelled to perform each problem satisfactorily before progressing to the next. Every morning he was given a short talk on technical factors involved. On Saturday morning he was questioned on the week's work.

The training progressed by weekly grading, which allowed a flexible and continuous scheme of instruction. At the beginning of each week a green squad of from ten to fourteen men entered the school. At the end of each week a finished squad was graduated. The new men would be taken in charge by the instructor supervising the first week's training. At the end of this time, provided their work was satisfactory, they would be advanced to the next grade under the instructor in charge of the second week's training.

This arrangement proved satisfactory, since it was possible for a student to advance more rapidly than his squad should his skill warrant it, or in case he were backward, to progress at a slower rate. Also, another important feature which had to be considered was that of instructors. In this scheme the instructors were specialized on a limited section of the training only. They could, therefore, be developed faster and more efficiently than if they were given a more or less general training for the entire course.

After a student had completed a problem, it was inspected by the instructor, and where required, the weld broken and the fracture examined. The student was graded accordingly. These grades were recorded and averaged with the grades given in the lecture room. If, at the end of four weeks, a student who had entered as a private was above a certain average, he was recommended for promotion to Private, First Class. During the last week of the training, the student was placed on practical jobs without any assistance from the instructors. This was in order that he attain confidence in his own ability to overcome difficulties that might confront him.

When he had satisfactorily completed his practical work he was given a written quizz, to refresh his mind on essential points. He was then awarded a certificate and relieved from the welding school detail, and held ready for assignment to duty. In active service the Motor Transport Corps graded the welders from Sergeants, senior grade, to Corporals, the average grade being Sergeant. The Sergeants, senior grade, were foreman welders connected with the welding department of the Base Repair Shops. The Corporals were helpers.

At the time of the signing of the Armistice only one of the three schools was in full operation. Due to delays in building appropriations the other school buildings were just being started. These were finally abandoned.

The Camp Holabird school, which was in operation, was housed in a three-storey distillery building already erected

†Paper read before International Acetylene Association New York

*Formerly Major M.T.C., U.S.A.

and because of this had several months' start on the others.

It was shown, in this method of training, that the difficulty connected with the production of welders was more or less imaginary. Of the men received—and these were not selected because of any particular qualifications — there were only about 8 per cent. rejections. In practically all cases this was due to disinclination rather than inability to absorb the training.

In proportioning the course, 3½ weeks were spent on steel 2 weeks on cast iron, 1 week on aluminum and the remainder on miscellaneous metals. Steel being the first metal tackled by the student, more time was spent on this, in order that he thoroughly master the fundamentals. Aluminum welding was grasped quite readily, as was also cast iron.

The welding school has become a permanent institution in the Motor Transport Corps. Originally conceived for emergency training it now fits in nicely with the educational plans that have been adopted for peace-time service. Recruits are given the opportunity of learning one or more of the trades connected with motor truck operation and maintenance. Oxy-acetylene welding has met with its share of popularity and it is believed that the school will be filled to its capacity at all times.

Worth-While Information From Many Points

A very effective agent for moisture-proofing wood has been found in an aluminum leaf coating. This coating practically insulates the wood against any change in atmospheric conditions, and is particularly valuable for use where accurate form and balance must be maintained, as would be necessary in an airplane propeller.

* * *

A statement issued by the British War Office gives the following interesting data regarding the comparative number of bombs dropped by aviators on both sides during a single month. In the area occupied by British troops in France during that period German aviators dropped 1,482 bombs, while British airmen let loose 7,653 bombs into German-occupied areas in the same month.

* * *

It is not generally known that the American Federal Board for Vocational Education maintains a course designed to prepare disabled soldiers for civil service positions. There are 32 men now studying to qualify themselves for positions under the civil service, and the Board will undertake to prepare any student who so desires, provided he can qualify as physically competent to do the work. Of course there are some regulations regarding these positions and men obviously handicapped cannot expect to hold down jobs where their physical disqualifications are such as to prevent the proper discharge of the duties. But on April 16 the President authorized an amendment to the civil service rules which permits the civil service commission to exempt from the physical requirements established for any position, a disabled and honorably discharged soldier or sailor or marine upon the certification of the Federal Board for Vocational Education that he has been specially trained for and has passed a practical test, demonstrating his physical ability to perform the work sought. Under the law a disabled soldier has a preference on the civil service list.

* * *

Mariners who frequent the coast of Peru are familiar with a curious phenomenon that occasionally prevails there —notably in the harbor of Calloa—commonly known as the "painter." The water becomes discolored and emits a nauseous smell, apparently due to sulphuretted hydrogen. The white paint of vessels becomes coated with a chocolate-colored slime; especially when the wet fog, known as the garua, prevails at the time. Presumably both the discoloration and the smell are due to the decomposition of marine organisms. In a paper recently presented to the Geographical Society of Lima, Senor J. A. de Lavalle y Garcia discusses this phenomenon (which he calls "aguaje") and concludes that the primary cause is the seasonal shift of ocean currents. The "painter" prevails during the months December to April, at which time the warm equatorial countercurrent displaces the cool Peruvian current. The resulting change in temperature of the ocean water would, he thinks, kill quantities of plankton, and the decay of this organic matter would give rise to the phenomena observed.

* * *

The inactivity of the Russian platinum mines has caused a corresponding increase in activity in Colombia. A large company has recently been formed to operate in Colombia, which is reported to hold 10,000 acres of land as well as 50 miles of river bottom. The operations of this company should materially increase the output of platinum from Colombia. It is announced that the War Department, through the Chief of Division of Sales of Munitions will dispose of 19,000 ounces of platinum at a minimum cost of $105 an ounce. A substitute for platinum in electrical apparatus has been the object of some private investigations. One satisfactory substitute for cathodes was found to be 90 per cent. gold and 10 per cent. copper.

* * *

According to an article in the London "Times" of recent date, the manufacture of laboratory glass started at Sheffield since the war has made substantial progress, though much remains to be done if the industry is to be commercially sound and able to compete in the world's markets. Prior to the war there was no manufacture of laboratory glass in Great Britain, and the whole process, hitherto confined to Germany, had to be discovered and workers specially trained. With this object, a department of glass technology was opened at Sheffield University with the support of the Government, and to-day the department is turning out work said to equal anything Germany ever produced. The experimental nature of the work has made the cost of production heavier than the German article, and to help this a glass research association is being formed. The British Government has been asked to provide $364,987 over a period of five years, and the manufacturers will contribute a further sum of $121,662. It is said that the first attention of the association will be directed to problems of machinery and labor-saving devices.

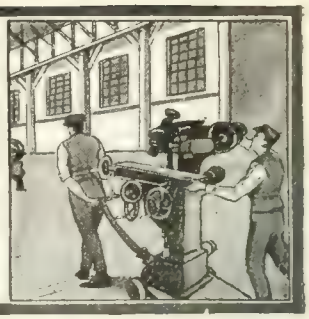
THE FUNDAMENTAL PRINCIPLES

Continued from page 411

ing the hazard. Gate guards and two-handed operations are sometimes necessary, but should be used only as a last resort. The methods above are more efficient because they go to the root of the matter and remove the hazard, rather than merely guarding it. When you remove the hazard you simplify the operation and therefore increase production. When you merely guard the hazard you may decrease production.

What I have said of the punch press is typical of many machines. Safety engineering does not consist in simply building wire mesh guards, nor in buying safety devices which look pretty in a catalogue, and putting them on the machine without regard to the wishes, the convenience, or the efficiency of the operator. The real safety engineer will, where necessary, study the operation of a machine until he understands it as well or better than the operator himself —as well as the foreman, the superintendent, the master mechanic; and then he will apply their brains and his own in working out either a guard, or a change in the machine, or a change in the operation, which will remove the underlying hazard and make the operation intrinsically safe.

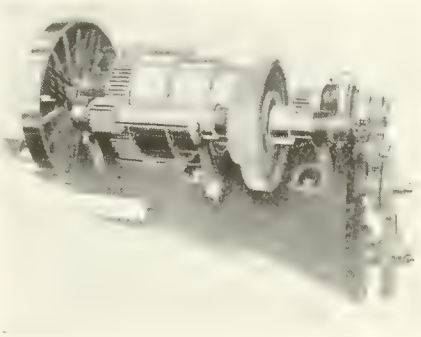
DEVELOPMENTS IN SHOP EQUIPMENT



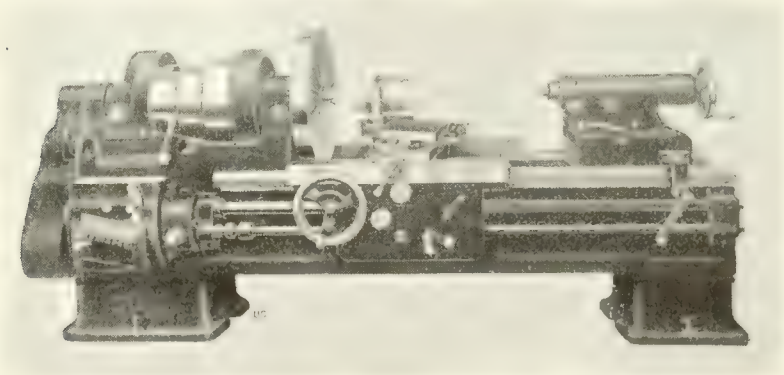
CINCINNATI 28-INCH SEVERE-DUTY LATHE

In Fig. 1 is shown a general view of the 28-in. "severe duty" lathe built by the Cincinnati Lathe and Tool Co., Cincinnati, Ohio. This machine is a larger edition of the 15- and 16-in. lathes manufactured by the same company for the last 15 years and includes the same features. Designed for heavy duty, the construction is neither complicated nor such as to make the parts cumbersome to handle. Fig. 2 shows the sliding double back gears from the rear.

The bed is 18¼ in. in depth and 23⅛ in. wide and is heavily braced with box-section girders to minimize twisting strains. Bed lengths from 10 to 30 ft. can be supplied, each size being 2 ft. longer than the preceding one. The cabinet legs are provided with two screws in the centre of each so that each end may be regulated to make the bed perfectly true. This arrangement makes wedges unnecessary.



SLIDING DOUBLE BACK GEARS AS SEEN FROM REAR.



Front bearing, 4½ in. x 7¾ in.; back bearing, 3⅜ in. x 5⅜ in.; width of belt, 5½ in.; hole through spindle, 2⅛ in., cutting tool size, ⅞ in. x 1¾ in.; diameter nose of spindle, 4 in.; diameter of tail-stock spindle, 3⅜ in.; length of carriage bearing on bed, 36 in.; ratio of back gears, 12¼ and 3 3-5 to 1; diameter of countershaft pulleys, 16 in. x 5½ in.; speed of countershaft, 185 to 225 r.p.m.; lengths of bed, 10 ft. to 30 ft.; distance between centers, 10-ft. bed, 60 in.; weight (net) 10-ft. lathe, 7,100 lb.; weight per extra 2 ft., 520 lbs.

The equipment supplied with the lathe includes the cabinet legs, a box-type apron, a chasing dial, an automatic stop, plain or compound rest, large and small faceplates, a steadyrest, a self-oiling two-speed friction pulley countershaft, a quick-change gear box giving a wide range of threads and feeds and the necessary wrenches.

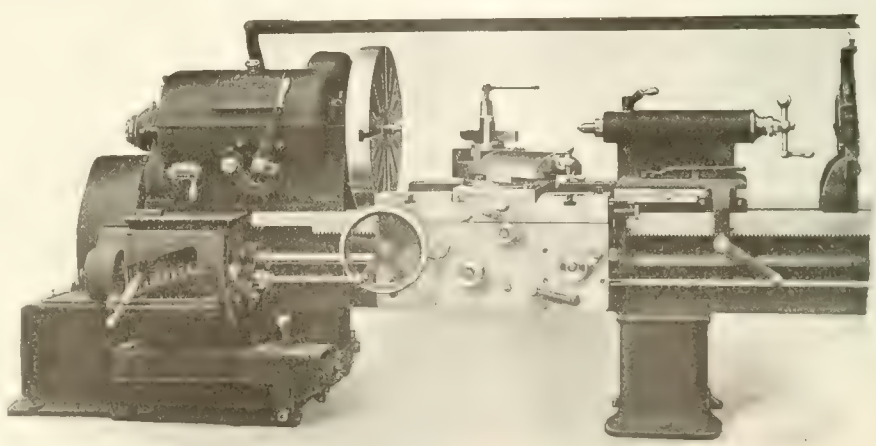
The following extra equipment can be furnished: turrets on carriage or bed, oil pan and pump, taper, relieving and draw-in attachments, chucks, etc. This machine may also be obtained with geared head for belt or motor drive.

Above are the principal specifications.

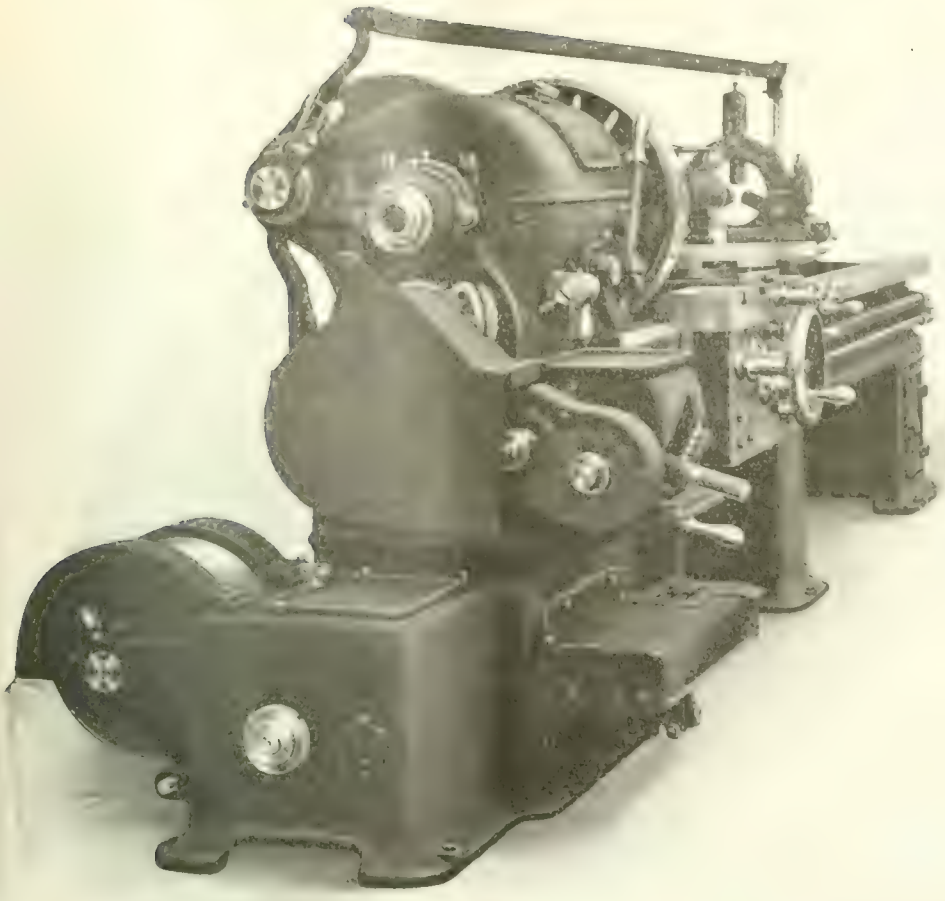
BRADFORD GEARED-HEAD LATHES

The Bradford Machine Tool Co., Eighth and Evans Sts., Cincinnati, Ohio, is now building a line of geared-head lathes in sizes ranging from 14 to 32 inches, inclusive. These machines may be equipped with either an individual electric motor drive or a single-pulley drive, according to the requirements of the purchaser. It will be apparent to those who are familiar with the cone pulley driven lathes of this company's manufacture, that the design of the new machine is essentially the same, with the exception of the driving arrangement. The dimensions of the cone-head or geared-head lathes are also the same, except that the available distance between centres is usually greater for machines with the geared head.

A feature of the new type of Bradford lathe equipped with an individual motor drive is the low mounting of the motor. The driving mechanism is placed beneath the bed and operates through a selective-speed gear-box which transmits power up to the spindle. Attention is called to the fact that the single-pulley drive for lathes of this type is interchangeable with the motor drive, and is similarly featured by the low mounting of the driving pulley. A machine so equipped requires only a single fixed pulley on the lineshaft, or a suitably located short shaft which is driven from the lineshaft, it being unnecessary to use a friction clutch operated countershaft. A selective-speed gear-box similar to that used with motor-driven lathes, is employed in the case of machines equipped with single-pulley drives. These machines can be installed



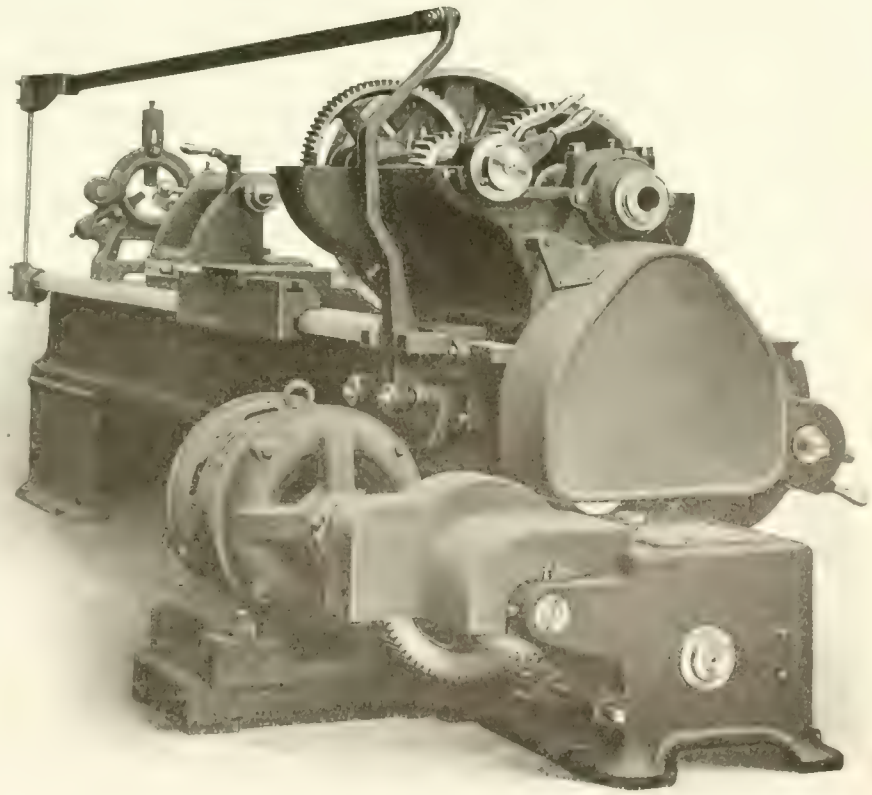
GENERAL VIEW OF THE LATHE.



BRADFORD GEARED HEAD LATHE, PULLEY DRIVE.

with either independent or group motor drive. In cases where a group drive is employed, a single motor-driven overhead shaft is used to carry the driving pulleys.

Regardless of whether these lathes are equipped with an individual motor drive or a single-pulley drive, the means furnished for the transmission of power is essentially the same. It consists of an arrangement of driving shafts and gears, as illustrated in Fig. 3. Six gears on shaft A afford six independent driving speeds for shaft B, which through intermediate shafts C and D, and the connecting chain E drives the lathe spindle. The drive is direct when clutch F engages gear G or power is transmitted through a back-gear shaft H when the positive clutch I engages gear J. Twelve spindle speeds are thus obtained, and corresponding reverse spindle speeds are obtained when the lower clutch K engages the chain drive L, automatically disengaging the clutch and driving gear M used for the forward drive. The operating arrangement on this machine includes an ordinary pole and speed-box lever that are in such operative connection with each other that gear shifts in the speed-box cannot be made unless the initial driving power clutch is moved by the shifter pole to its central, or disengaged, position. By this arrangement,



BRADFORD GEARED HEAD LATHE WITH INDIVIDUAL MOTOR DRIVE.

which is effective through all [illegible] ing device, no abuse of mating gears in the speed-box is possible because they can only be engaged after the driving power is disengaged by the shifter pole.

Mechanical speeds through the speed-box are selective and instantly obtained by sequential movements of the shifter pole and speed-box lever. Provision is made for starting, stopping, or reversing the lathe by means of the shifter [illegible].

◆

BOWSER OIL STORAGE SYSTEMS

The S. F. Bowser Company, Ltd., Toronto, Ontario, Canada, have issued a very interesting little booklet entitled "How Bowser equipment saves oil, time, money. In this they state various points of interest and value to those in need of such equipment, and readers interested can procure a copy by writing for the same.

◆

The Chain Products Co., of Cleveland, Ohio, have issued a very attractive and useful catalogue, which is especially useful to anyone interested in chain products of any nature.

This book, known as their catalogue No. 30, consists of 111 pages, and is divided into three sections. The first is devoted to coil chain, the second to chain specialties, and the third to miscellaneous attachments. Several wire and chain tables form a closing part of this book, which should be in the hands of those interested in weldless chain.

The MacLean Publishing Company
LIMITED
(ESTABLISHED 1887)
JOHN BAYNE MACLEAN, President. H. T. HUNTER, Vice-President
H. V. TYRRELL, General Manager.
PUBLISHERS OF

CANADIAN MACHINERY
AND MANUFACTURING NEWS

A weekly journal devoted to the machinery and manufacturing interests.

B. G. NEWTON, Manager. A. R. KENNEDY, Managing Editor.
Associate Editors:
W. F. SUTHERLAND T. H. FENNER J. H. RODGERS (Montreal)
J. H. MOORE.

Office of Publication, 143-153 University Avenue, Toronto, Ontario.

VOL. XXII. TORONTO, October 23, 1919 No. 17

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Ontario Votes to Stay Dry

AT this writing it becomes increasingly apparent that booze has been voted out of Ontario. The ballot was rather a confused affair, for either wets or drys, but that did not keep the people of this good province from coming out with a death wallop to the most damnable traffic it ever housed.

When they were at it they should have hit harder.

John Barleycorn used to hit hard. He never showed quarter. When his man showed signs of going under he never quit.

John Barleycorn stayed with his victim until his health, his home, his money, his all was gone. It left him only when the undertaker came along to clean up the mess.

The liquor traffic is not entitled to sympathy. It gave none and should expect none.

The next move should be to have prohibition for those who have a private grog shop in their cellars.

The little chap who had only ten cents or a quarter to spend at the bar has had his schooling, his feelings have been hurt and his long dry thirst has not been cured except as he takes it to the tap.

The man who was afraid to face the drought, and who stocked his cellar, was not big enough to take his trimming along with the little chap who used to pound the brass rail at the corner hotel.

He has still to learn what it means to curb an appetite or control a passion. It is up to him, if he wants to demonstrate that he is as good a citizen and law-keeper as the little fellow, to come across and keep the spirit of the law rather than to glory in the ability of the secrecy of his cellar to defy and break the real meaning and purpose of prohibitory legislation.

Industrial Ontario has done well. She now faces an era of sobriety and development. She will never live to regret the vote she gave on October 20th.

SPEAKING of wages, one writer pauses to remark that the laborer feels worthy of his "higher."

Why Not Talk Plain English?

ON the 25th of September the Ontario Government desired to inform the people that an election was going to be held. Not much of a trick to do this. The people would hear of it quickly through the papers, but it must be officially said so in the Ontario *Gazette*.

Never heard of the Ontario *Gazette*?

Well, that's not strange. But let's get back to this question of holding an election. The people must be told that the present House is through, that nominations and elections were coming, one on the 13th and other on the 20th. Nothing much in that—but hold!

The chant runs thusly in an extra edition of the aforesaid and unknown *Gazette*:—

PROCLAMATION.

John S. Hendrie.

Canada.

Province of Ontario.

George the Fifth by the Grace of God of the United Kingdom of Great Britain and Ireland and of the British Dominions beyond the Seas, King, Defender of the Faith, Emperor of India.

To all to whom these presents shall come or to whom the same may concern:— Greetings:

W. H. Hearst,
For Attorney-General,

Proclamation.

Whereas we have thought fit, with the advice and consent of the Executive Council of our Province of Ontario, to dissolve the present Legislative Assembly, and to forthwith call a new Legislative Assembly;

Now know ye that we do hereby make known Our Royal will and pleasure to dissolve the present Legislative Assembly, and to call a new Legislative Assembly of our said province, and we do further declare that by the advice of our said Executive Council we have this day given orders for issuing our writs in due form for calling a new Legislative Assembly of our said province as aforesaid, the said writs to bear date the twenty-third day of September, A.D. 1919, and to be returnable forthwith after the execution thereof.

". . . Of all which premises all our loving subjects and all others whom it doth or may in anywise concern are hereby required to take notice and govern themselves accordingly.

"In testimony whereof we have caused these our Letters to be made Patent and the Great Seal of our Province of Ontario to be hereunto affixed.

"Witness:

"His Honor Sir John Strathearn Hendrie, Knight Commander of Our Most Distinguished Order of St. Michael and St. George, Commander of our Royal Victorian Order, a Colonel in Our Militia of Canada, etc., etc., Lieutenant-Governor of our Province of Ontario, at our Government House, in Our City of Toronto, in our Said Province, the twenty-third day of September, in the year of our Lord, 1919, and in the tenth year of Our Reign."

Why not put the pruning hook into about 90 per cent. of that junk? All that is necessary is to state that nominations are on the 13th and elections on the 20th.

It is not necessary to drag all the other individuals and organizations and orders and whereases into the case at all.

The Ontario *Gazette* is due for a shave and a hair-cut all at the one sitting.

CANADA is soon going to have 20,000 miles of Government-owned and operated railroads. This is a much greater mileage than the Government is now muddling with. But—the greater the mileage the greater the muddle.

* *

A CAMPAIGN to stop smoking makes no headway. It's impossible to control the crop of tobacco, cabbages, mullin leaves, cedar bark, smoking cane and whip handles.

* * *

THERE'S many a four-flusher discussing with his friends the location of the Rolls-Royce plant in America, and at the same time reading the sale ads. for a mussed-up flivver.

State of Mind of the Foreigner in this Land

SOME of the members of the committee investigating conditions in the steel mills of United States seemed to be surprised that they should find notices to the foreign employees printed in five different languages.

The surprise should not have been at such a thing, but at the members of the committee, public men, supposedly in touch with what is happening in their country, being ignorant of this condition.

This particular condition is not exclusively the property of the United States. Its duplicate can be found in several lines in Canada.

For years it has been a hard matter to call attention to the real foreign problem. When it was brought up by labor interests the cry was raised that labor wanted to shut them out to keep the price of labor at a higher mark. And it might be added right here that if the only aim of bringing foreigners to this country is to bring them here to compete with our own labor, and force down the standard of living, then the time is ripe to slam the national front door in a mighty emphatic manner.

On this page we show a reproduction of a picture that was found in several places in the homes of foreigners employed in the U. S. steel mills. It is the conception that some of the foreigners have of the way they are being treated and exploited under the capitalist system.

Look at the thing, and then imagine the state of mind of the ignorant foreigner who has been brought up in such an atmosphere.

Look at the thing and you can see there the passions and the hatred that the agitator calls into play when he wants to sand-bag industrial life on this continent.

For the purpose of this article, CANADIAN MACHINERY eliminates the international boundary between Canada and United States, for the very good reason that their problems in dealing with the foreigner are our problems. The history of the strikes of 1919 prove that beyond the chance of successful contradiction.

The talk of Americanization and Canadianization in relation to these people is folly unless we are prepared to realize that they can make or break our national happiness and prosperity.

On election day in Toronto, in the foreign districts, one could see these men in hundreds after hundreds, pouring into the polling booths, voting on what manner of laws we shall have in this land.

Do they fully understand the things about which they vote?

They do not.

Have they any good idea of what the things they vote for mean to the land?

None at all.

Do they understand or appreciate what a prohibitory law has worked for Ontario in the way of the reduction of crime, and the increased bank deposits of hundreds of people?

No, they do not. Nor do they care a whit. They were out, every man jack of them, voting for the repeal of the O.T.A.

The skilful politician makes all sorts of appeals to their fancies and their prejudices, and their votes are counted to kill the expression of opinion of men and women whose every interest is tied up in the development of this Canada of ours.

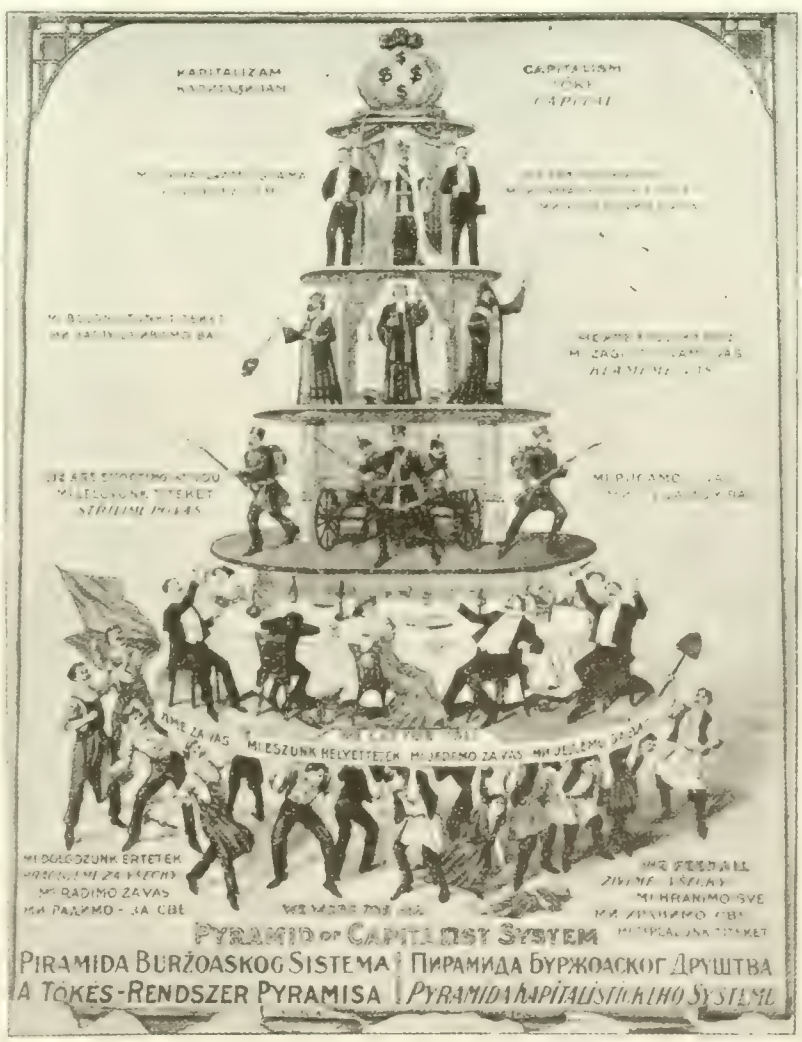
But to return to the picture on this page. Is it possible to make a good Canadian or a good American out of a man who is cherishing the thought that the system of Government, the church, the militia are all framed and brought into existence for the sole purpose of becoming a millstone around his neck, to grind him down and to keep him down?

The only answer to such a query is a plain and emphatic NO!

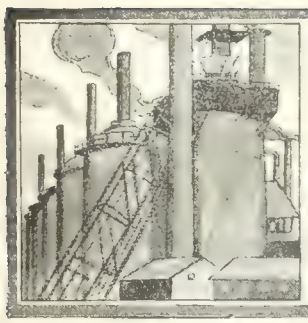
The man who has this picture burned into his mind will look upon almost every move that is made for his betterment as a move on the part of the capitalist class to further draw the cord around him. He cannot be approached as a man with an open mind. The agitator keeps this picture before him. He has been doing it for years in Canada and he has been doing it for years in United Sates. And all the while he has been more or less unmolested in his damnable occupation.

That same doctrine has been shouted up and down the coal mining areas of Western Canada for years. Men from the Old Country — not foreigners — have been the leaders in the movement in many cases. It has

(Cont. on page 56)



HOW THE AGITATOR WORKS ON THE FOREIGN MIND



MARKET DEVELOPMENTS

Automobile Business Buys Many Machine Tools

This Industry is Probably Leading All Others in Being a Consistent Customer—Motors Are a Month to Six Weeks Off in Delivery—Scrap Buying Better in Canada

THE "A" industries are still doing the bulk of the buying as far as machine tools and supplies generally are concerned. In this case the "A" industries take in the automobile and agricultural shops. There must be a very large market for cars in this country now, and prospects of tremendous sales in the spring, as the matter of selling takes very secondary consideration to the problem of production now. Plants that have been in existence only a short time are already planning to what extent they will build their extensions, and all this means that there will be a big market for tools and supplies.

The steel strike in United States has had the effect of slowing down the deliveries of material to this country, until at present it can be estimated as about thirty-five per cent. of normal, and slower in proportion. In some cases, though, material comes through well, as one of the shipbuilding concerns got a nice tonnage of plate across that only went to the mills in the middle of September. But the recovery of production at the mills themselves is slow, and business is piling up at the mills, although it must be said that the trade in general is giving every leniency to the mills in the matter of deliveries.

The general development that is taking place all over the country is reflected in many ways. For instance, the sale of motors—small sizes, from one to thirty horsepower—is very brisk, the demand coming from small shops all over the country in a diversified line of business. Deliveries used to be made almost at once out of stock for any of these motors, but now it is a matter of four to six weeks before deliveries can be made. In used motors, attention should again be drawn to the advisability of care in buying these. The best plan is to get them, if necessary at all, through a reliable dealer, or else to have an expert of the customer's choosing look over the proposition.

The scrap metal market shows some firmness, buying for domestic causes being better, although sales to United States are not being put through now. Prices are strong in some lines, especially heavy melting steel, and prices may be marked up a little later on.

BETTER CONDITIONS ARE EVIDENT IN THE SHIPPING CIRCLES AT MONTREAL

Special to CANADIAN MACHINERY.

MONTREAL, Que., Oct. 23.—The settlement of the English strike has been reflected here in the better conditions that are evident in and about the harbor. Congestion of freight is less pronounced and arrivals and sailings are more regular, although some time must elapse before things are again normal. During the past week or so lake boats loaded with grain have been laid up in port for some time before they could discharge their cargoes, as no ocean boats were on hand to take the grain from the elevators that have often been filled to capacity. Relief is now in sight and it is being felt in general business throughout the district. Many American concerns are locating branch factories in the district, and some Canadian enterprises are being developed, all of which will add to the coming season's activities.

Strike Has Little Effect Here

The experience of dealers and consumers seems to be that little difficulty has arisen as a consequence of the disturbances in the American steel districts. At times the shipment of material has been somewhat delayed and has resulted in temporary inconvenience, but on the whole the industrial activities, that are dependent on steel commodities, have not suffered very heavily by the steel strike in the States. One large dealer states that they are receiving regular shipments of material from the Carnegie plants at Pittsburgh, and with few exceptions the material has been delivered on schedule time. It might be mentioned, however, that the present demands are only normal, and it is generally believed that mill supplies are still ample for current needs, and that steel production, in the aggregate, is little below what it was when the strike became effective. Existing demands have not been pressing, and in most instances, dealers have been able to supply all the needs of the trade, unless the inquiry is for special shapes or sizes, and while some trouble has been experienced in getting these through promptly, they invariably come to hand after a short delay.

Canadian mills are quite busy, and where the product is similar to American mills affected by the strike, the volume of business has shown a fair increase. Dealers here believe that price quotations will continue firm for some time, but would not be surprised to see advances when conditions are more settled. While it is difficult to get accurate record of conditions as they exist in the affected steel centres in the States, it is believed that production is much lower than before the strike, but it is anticipated that a steady improvement will be shown from now on, as many of the mills are gradually resuming normal operations. Some districts are about back to capacity and others are slowly progressing.

Metals Generally Firm

The metal situation has been quite active during the past week, and the demand in general has been good, particularly in lead, the sales in this metal

having been above normal. Copper is moving freely but has been somewhat affected by the steel strike as the demand has fallen off. As a result the market is weaker and prices have declined ½ cent per pound. Quotations on the market here are 25 cents for lake and 24½ cents for electro and castings. Tin is steady but slightly easier, the quotation of 58 cents being a decline of 1 cent per pound. Spelter is ½ cent stronger at 10 cents per pound. Lead is active on an advance of ½ cent, the price quoted being 7¾ cents per pound. Antimony has also improved, the price asked being 10 cents, an advance of ¼ cent per pound.

Gradual Increased Tool Demand

Reports from dealers on machine tool activity would indicate that the volume of business passing is comparatively steady and quite normal. Some report very good business, while others report a quiet week, but the general impression is one of steady increase. Large single sales are not the order of the day, although some good business has been done in this respect. The bulk of the present demand is well distributed, and when the total is compiled the relative turnover compares favorably with pre-war business. An encouraging factor at the present time is in the inquiries that are coming in from agents here, who are looking over the ground with a view of establishing branches of American industries. Two of these enterprises are associated with railroad requirements, and machine tool dealers here have had inquiries regarding the necessary equipment; some good business is anticipated. The volume of supply business seems to be good, and dealers are apparently satisfied with the present demand, and while it may not be up to war requirements, it compares favorably with the demand of 1914. Some difficulty has developed in obtaining delivery of tools and supplies, and this condition is frequently felt by manufacturers, as the gradual freeing of the market of used equipment makes it harder to secure tools of this character. This feature of present activities sends a note of encouragement through the trade as it was fully expected that second-hand tools would become a drug on the market. A firm making air compressors says that the better inquiry for new machines is a result of the absorption of the greater number of the used tools, which, for a time after the war, were quite plentiful.

Quiet Business in Scrap

There is not sufficient offering in the scrap market to create any special interest at the present time. There is very little scrap of any kind going into the States, as the curtailment of the production, as a result of the strike in the steel mills, has affected the situation here. One American dealer has sent out notices to the Canadian trade that he is in the market for considerable quantities of machine shop turnings, but the price offered (f.o.b. delivery point) is little inducement to local dealers, as it is much lower than that which the material should demand, with freight, etc., added to the prevailing quotation here. The local demand for this class of scrap is almost equal to the supply, so that dealers would not be interested unless the American consideration was worth while. There is a steady demand for machine cast iron, but the volume is seldom large as consumers are content to operate on the basis of present requirements. The general listless character of the market has dulled the interest of the dealer, and he, like the trade, is calmly waiting further developments. Quotations are unchanged with a weak tendency.

POINTS IN WEEK'S MARKETING NOTES

Deliveries of material from the strike zone in United States are coming through rather slowly. A fair tonnage of plates and skelp arrived at the first of the week.

Canadian mills and foundries are buying fairly large quantities of scrap just now, and there is somewhat of a shortage in heavy melting steel.

A revision of classes for the purpose of simplicity has been made in the lists of carbon cutters, reamers and drills, and the discounts announced show a slight increase in prices.

There is a brisk demand for motors just now, especially in the smaller sizes, from one to thirty horsepower. Delivery of most of these is now from four to six weeks.

Makers of some of the better lines of machine tools have sent out word that they are now sold out until next May.

Although more men are returning to work in the steel mills of United States, production is increasing very slowly, and some of the mills are still operating at a very low percentage of their normal capacity.

MATERIAL SLOW IN GETTING ACROSS LINE

But Industries Not Suffering Much Yet From the Steel Strike in United States

TORONTO.—Conditions in the machinery lines seem to differ just now according to location. In some sections there is a good demand for some lines, while in other places the same lines are away off. But for all that, there is a general tie-up of business moving, although the distance between orders and delivery schedule is becoming greater and greater. Nearly all the business now is for delivery well on into 1920.

The Machinery Business

There seems to be a big market opening up for machine tools in Canada. There are firms that have not closed big business recently, but they are willing to admit that the situation is good. There seems to be a revival of the small shop all over Ontario. By this we do not necessarily mean the small machine shop, but the small shop in many lines, such as wood working of various kinds, building contractors, etc. This is reflected in the sale of motors, and there is something very closely akin to a shortage of the small motor at the moment. As a general thing motors are to be had on very short notice from either the makers or the jobbers, but such is not the case now. The best that can be done in the way of deliveries now is from three to six weeks.

According to information reaching CANADIAN MACHINERY, there have been several sales of used motors put through recently that have not given satisfactory service. It has been pointed out in these columns before, and it should be repeated: Do not buy motors unless you know what you are getting. If you get a used motor, get it through a responsible machinery dealer who will stand behind it, or have some of your own men who understand motors, to go over it.

As mentioned above, it is the small shop that is buying motors in Ontario now. These places did not go ahead during the war. They were tied up in many ways, and are now getting under way again. Where they are buying motors it goes without saying that they will be buying other things, so it all means more business for the machinery dealers.

The lumbering business is going to be better in the next few months than for some time past, from the standpoint of the men who sell machinery and supplies to the mills. There is a very heavy demand in British Columbia for lumber for export, and for many of the markets in United States. There is not a very large amount of B. C. lumber reaching the prairies just now. The export business is nicer to handle and seems to have the call on the available supply.

The automobile business continues to buy a lot of equipment. There is undoubtedly a very good market for automobiles in this country at the present moment, particularly for the medium priced car. The official of one of the large Canadian companies informed this paper only a few days ago that selling cars just now hardly entered into the question at all. It was purely a matter of production.

The agricultural implement places are also doing a fair amount of general buying.

The Effect of the Strike

The shipments of steel and iron from the strike zone are not improving. The strike is still on, and although it is claimed that it is practically lost to the men, it must be admitted that the production of the mills has suffered a very severe

setback, from which it seems hard work to recover. A large importer stated to CANADIAN MACHINERY this week that he would put the amount of material coming through at the present time at about thirty-five per cent. of the normal business, while the delivery dates were also suffering in proportion. Some of the shipyards have received a very fair amount of plate during the last few days, and it is also noted that there have been further shipments of skelp for the tube mills.

Tubes are in demand, but they are coming across poorly. Mills that were counted upon to stand up under strike conditions, are badly crippled, and are not making anything like the progress that was counted upon. One Toronto dealer was informed by a U.S. mill in the strike zone that they were doing little better than ten per cent. capacity, which is far below the rate at which this or any other mill can run and turn out material at overhead prices.

Although some plate has come through in a month from the date of shipment, it is feeling the strike in many quarters. Plate shipments, as a rule, are off by many weeks, although, fortunately, there has been no serious inconvenience so far.

Bars and shapes are not keeping pace with the demands on them. Especially is it true that the demand for shapes, which is a very large class, is away ahead of any possibility of shipment.

Cutting Off the Jobber?

Some of the jobbing houses here state that they have been placed in a position where they get no protection from the makers of Canadian cutters, reamers and drills. That is, the makers will quote a consumer as good a price as he can get from the jobber. Of course, the jobbers are none too well pleased with this arrangement, but it is a fact that it is the same condition that has existed for some time. Prices and discounts have been such as to bring selling figures down to the point where the makers felt that they must have the entire revenue. "Of course, the jobbers," stated one dealer to-day, "will continue to carry the stock, but they will sell as a matter of convenience to their trade."

One of the representatives of the drill makers stated that they had their own men in the principal cities, and they would cover the territory in this way.

There has been a slight increase in the selling price of carbon drills and also in the method of classifying. Formerly there were a large number of prices, but this has been brought down to three as follows:

Half-inch and down.
Half-inch to inch.
Inch and over.

In regard to the discount on these lines, it is now half-inch and down list, plus 20 per cent.; half to one inch, list plus 30 per cent.; over one inch, 35 per cent.

The Scrap Metal Market

The strike situation in United States has for the time being blocked shipments that might otherwise have gone over the border. Dealers on this side have been informed—warned is a better word—that shipments had better be held back, and that if made they will be at the risk of the sender for any costs that may be incurred in non-delivery or acceptance. The Canadian mills and shops are the best customers just now for the scrap yards, and a nice amount of business is moving.

Prices have not been changed at all, although the tendency is certainly for higher values in heavy melting steel. There is not a great deal of this in the country just now. All the scrap shell steel has been disposed of and little else has been coming into the market.

Some of the yards reported that they had received inquiries from New York for copper at 19¼, the first unsolicited inquiry that had come through for weeks.

Apparently some of the U. S. yards have reckoned that Canadian sellers would be unable to sell in their regular places. The Hofmann-Sproul Co., Widener Building, Philadelphia, are offering to take a big tonnage for the next 30 days of machine shop turnings. They offer $14.50 gross ton, f.o.b. cars Norristown, Pa. Dealers here are offering about six or seven dollars for this material, but of course, the freight and other charges must be added, which would bring the figure up around $13 or $13.50.

GREAT QUANTITIES OF USED MACHINES WILL BE PLACED ON U.S. MARKET

Special to CANADIAN MACHINERY.

NEW YORK, Oct. 23.—Business continues at a good rate, the number of inquiries and orders for machine tools keeping up about the same as during recent weeks. Most of the orders placed are for domestic shipment, export trade being rather quiet, due mainly to the continued unfavorable rates of exchange between the United States and European countries.

Among the more important inquiries of the past week is one from the General Electric Co., Schenectady, N.Y., for about 50 miscellaneous tools. The E. W. Bliss Co., Brooklyn, N.Y., continues as a large buyer, most of its requirements being heavy tools.

There has been a good general inquiry. One company has bought a small list of tools for the manufacture of talking machine motors; a linotype company has bought several tools and there are scattered orders and inquiries from industries in many lines.

The United States Aluminum Company of Pittsburgh has let a contract to the Turner Construction Co., New York, for a new factory building at Edgewater, N.J. Six cranes of this plant have been bought from the Morgan Engineering Co., Alliance, Ohio.

Looking For Export

The National Machine Tool Builders' Association held its fall meeting at the Hotel Astor, New York, on Wednesday and Thursday, October 15 and 16. Among the subjects discussed was the advisability of publishing a co-operative export catalogue of machine tools in several languages for world-wide distribution. Committees were appointed to look into the matter and bring in a definite report at the next convention, which will be held at the Hotel Traymore, Atlantic City, N.J., in the spring. A resolution was adopted opposing the adoption of the metric system in the United States. Charles E. Hildreth, general manager of the association, who was appointed by the War Department to assist in planning for the sale of surplus Government stocks of machinery, reported that his task was completed and that $60,000,000 to $70,000,000 of new and used tools will be put on the market within a few weeks. Selling prices have been established, based on the prevailing market prices minus adequate reductions to cover usage and depreciation. The tools will not be sold on sealed proposals, as was at first considered, but will be offered in very much the same way that dealers in second-hand machinery make their sales. Of the surplus about $20,000,000 worth are special machines and the remainder are standard tools.

PRODUCTION IMPROVES, BUT IT IS AT A VERY SLOW RATE IN STEEL MILLS

Special to CANADIAN MACHINERY.

PITTSBURGH, PA., Oct. 23.—The iron and steel strike continues to wane and employment and production at the blast furnaces and steel mills continue to increase, but the rate of change continues to be a very slow one. Production even now is only about 60 per cent. of normal, taking the iron and steel industry as a whole.

When the manufacturers as well as all, or nearly all, outside observers have felt since the first few days that the strike could not possibly win, it seems strange that after four weeks of strike men should be returning to employment so slowly. The common if not universal theory is that the strike leaders have been bolstering up the strike by promising their representatives in the field, and the strikers themselves, that something favorable to the cause of the strike is going to come from the labor confer-

ence at Washington, which assembled when the strike had been in progress for two weeks.

It is altogether improbable, however, that there will be any action of that sort at Washington. The resolution introduced by the labor representatives, for an investigation of the steel strike by a committee of six, is probably buried. The resolution recognizing collective bargaining has had an irregular course, but it adopted it would not help the steel strike particularly.

Just how the strike leaders themselves view the strike is not known. Their claims from day to day are usually that they "are holding their own," which is not a strong claim to make, since holding their own would be quite insufficient to enable them to win the strike when they have considerably less than half the industry tied up. If they believe the reports sent them from the field they consider the strike stronger than it is, for some of the reports that the manufacturers have seen are absurd exaggerations, but it is not probable that the leaders really believe these reports. The leaders seem to be concentrating their energy in efforts to hold meetings in the Pittsburgh district. They approached Pittsburgh city council to investigate the Mayor's refusal to sanction meetings in the strike districts, but council would not take the matter up. The city administration allows meetings in certain portions of the city, where there are no strikes, but refuses to permit meetings near mills that are affected by strikes, on the ground that disorder would likely result. Through their attorney, Rubin, they approached the Sheriff of Allegheny County, who made a very vigorous reply, charging the strike leaders with preaching revolution and with being outsiders who came into the country to make trouble, and whose departure will prove very welcome.

Employment and Production

In the general Pittsburgh district in the past week each day has seen a little more employment, on the whole, at mills affected by the strike. Of men employed the great majority now are new men, there being only a few strikers. The result will be that of the mills being fully manned with some of the former employees left out. It is thought that many of the new men taking employment in the Pittsburgh district are from Youngstown and other points that are closed, or nearly closed, by the strike.

Donora and Monessen, at the head of the Monongahela Valley, the most important part of the Pittsburgh district, were closed entirely in the early part of the strike. For two weeks the mills have been open and men have been returning to work, but at a very slow rate. The large mills near the foot of the valley ran fairly well even at the height of the strike, and are doing better from week to week, but of the four largest steel mills only one is fully manned even now. The others are short by perhaps 15 per cent. on an average. Nearly all the blast furnaces attached are operating, but are not producing full tonnages. Nine Edgar Thomson blast furnaces are operating, against eight just before the strike, and three on the third day of the strike.

A fortnight ago this report gave a summary of the strike from the geographic standpoint. The strike was strong at certain detached points, including Buffalo, N.Y.; Johnstown, Pa., and Pueblo, Colo., and then there was a sharply defined strike belt dividing Western Pennsylvania, which has been running moderately well from, the west, which has been running at various rates. This belt comprised the Wheeling district, the Mahoning valley and Cleveland, making almost a continuous line north and south. There was speculation as to where in this strike belt the first marked break would occur, as everything in it was closed, blast furnaces, steel works and finishing mills. That question has been answered in the past ten days, the break occurring at Youngstown, the centre of the Mahoning Valley. The break, however, has not proved to be a sharp one by any means. There is nothing like a stampede. After the first blast furnace resumed it was fully a week before there were five operating, although there are 27 in the Mahoning Valley, and 22 of them were operating just before the strike. These furnaces operating are two of the Youngstown Sheet and Tube Company, and one each of the Republic Iron and Steel Company, Carnegie Steel Company and Brier Hill Steel Company. Each of these concerns is operating a few open-hearth furnaces in a more or less limping way, while one has a Bessemer converter in operation, and all the mills are doing a little rolling. Altogether, the production is too small to make it worth while to attempt a guess at the percentage of normal represented, but at any rate, there is a start, and the start has not been accompanied by any disorder to speak of. If there had been stronger forces available to the civic authorities for protection the return of the men would doubtless have been more rapid. As the principal works of the Carnegie Steel Company are located elsewhere, that company has trailed behind in the matter of attempting to resume, feeling that the local interests should take the lead.

Production of steel in the industry as a whole is between 55 and 60 per cent. of normal, representing a gain of only a few per cent. from the low point, probably not more than about 5 per cent. gain. Employment is somewhat greater, in point of percentage, than production, as the working forces are not well organized or balanced in the mills that are subject to strike.

CUSTOMS ARE CHANGING IN THE OLD COUNTRY MACHINE TOOL PLANTS

RALPH Williams, who has been in the machine tool department of the A. R. Williams Co., for a number of years, has just returned from an extended visit to his old home in England. He also made trips to Paris and other points on the continent.

"The machine tool builders of the Old Country are busy," stated Mr. Williams to a representative of CANADIAN MACHINERY. "I was in a large number of the shops in Birmingham, Coventry, Halifax and Wakefield, and in nearly every case they are booked up from six to twelve months in advance. In these shops they are turning out such lines as presses, turret lathes, standard lathes, radial drills, etc. Heavy machinery for shipbuilders is also greatly in demand, such as plate planers, shears, etc.

"Costs have gone up in the Old Country production the same as they have here, and in many cases more so, and there have been considerable changes made in the methods of shop practice. Many of the plants are making use of the bonus system, while it is not at all uncommon to find large English shops organized now along the same lines as the shops in United States. The unit system of construction is quite common.

"Labor conditions are not good, and production is not nearly what it should be, and for that reason the costs of machine tools are higher in England, in proportion to what they used to be, than they are in this country or United States.

"Another matter that has been taken up by the English machine tool builder is the cutting out off odd sizes and lines, and bringing his whole business down to a standard. In one shop where they used to make up around twenty classes, they are down to two. In this way they are able to re-arrange their whole works so they can get ahead on the basis of quantity production. In former times every machine that was turned out was more or less of a special proposition. This is having another effect, and that is the doing away with the general mechanic. It has been the custom in the Old Country for a long time that a mechanic should have a general knowledge of the whole field in which he worked. He could go ahead on any machine in the place and do a day's work there, and next day, if necessary, he could come in just as handy on a bench job. But that is all changing, and you find the Old Country shop specializing, so that the all-round mechanic becomes a specialist on a grinding machine, on a planer, lathe, etc."

According to Mr. Williams some of the British machine tool builders were busy now finishing up pre-war contracts at pre-war prices, on which they were sure to lose a goodly sum of money. Apparently they considered that these contracts were binding, as he instanced one case where a firm was sending out one hundred big lathes to a Japanese consignment, at a price that could not possibly represent anything like the present-day value of the tools.

SELECTED MARKET QUOTATIONS

Being a record of prices current on raw and finished material entering into the manufacture of mechanical and general engineering products.

PIG IRON

Grey forge, Pittsburgh	$27 15
Lake Superior, charcoal, Chicago	34 60
Standard low phos., Philadelphia	$38 00-40 00
Bessemer, Pittsburgh	29 35
Basic, Valley furnace	25 75
Toronto price:—	
Silicon..2.25% to 2.75%	$32.75 to $35.75

IRON AND STEEL

Per lb. to Large Buyers	Cents
Iron bars, base, Toronto	$ 4 25
Steel bars, base, Toronto	4 25
Steel bars, 2 in. to 4 in. base	5 50
Steel bars, 4 in. and larger base	6 00
Iron bars, base, Montreal	3 75
Steel bars, base, Montreal	3 75
Reinforcing bars, base	4 50
Steel hoops	5 50
Norway iron	11 00
Tire steel	5 50
Spring steel	8 00
Brand steel, No. 10 gauge, base	4 40
Chequered floor plate, 3-16 in.	6 50
Chequered floor plate, ¼ in.	6 25
Staybolt iron	8 00
Bessemer rails, heavy, at mill	....
Steel bars, Pittsburgh	2 35
Tank plates, Pittsburgh	2 65
Structural shapes, Pittsburgh	2 45
Steel hoops, Pittsburgh	3 05
F.O.B., Toronto Warehouse	
Small sapes	4 25
F.O.B. Chicago Warehouse	
Steel bars	3 62
Structural shapes	3 72
Plates	3 90
Small shapes under 3"	3 62

FREIGHT RATES

	Per 100 Pounds. C.L.	L.C.L.
Pittsburgh to Following Points		
Montreal	33	45
St. John, N.B.	41½	55
Halifax	49	64½
Toronto	27	39
Guelph	27	39
London	27	39
Windsor	27	39
Winnipeg	89½	135

METALS

	Gross.	
Lake copper	$25 50	$26 25
Electro copper	25 00	26 00
Castings, copper	25 00	25 00
Tin	59 00	58 00
Spelter	9 50	10 00
Lead	7 25	7 00
Antimony	9 75	10 50
Aluminum	33 00	35 00

Prices per 100 lbs.

PLATES

	Montreal	Toronto
Plates, ½ up	$ 4 50	$ 4 50
Plates, 3-16 in.	4 90	4 90

Price List No. 38

WROUGHT PIPES

Standard Buttweld

⅛ in.	$ 6 00	$ 8 00
¼ in.	4 68	6 81
⅜ in.	4 68	6 81
½ in.	6 21	7 78
¾ in.	7 82	9 95
1 in.	11 56	14 71
1¼ in.	15 64	19 90
1½ in.	18 70	23 76
2 in.	25 16	32 01
2½ in.	40 37	51 19
3 in.	52 79	66 94
3½ in.	67 16	84 18
4 in.	79 57	99 74

Standard Lapweld

2 in.	38 81	35 34
2½ in.	42 12	52 36
3 in.	55 08	68 47
3½ in.	69 00	86 94
4 in.	81 75	103 00
4½ in.	93	1 18
5 in.	1 08	1 37
6 in.	1 40	1 78
7 in.	1 83	2 32
8L in.	1 93	2 44
8 in.	2 22	2 81
9 in.	2 66	3 36
10L in.	2 46	3 12
10 in.	3 17	4 02

Terms 2% 30 days, approved credit.

Freight equalized on Chatham, Guelph, Hamilton, London, Montreal, Toronto, Welland.

Prices—Ontario, Quebec and Maritime Provinces

WROUGHT NIPPLES

4" and under, 60%.
4½" and larger 50%.
4" and under, running thread, 30%.
Standard couplings, 4" and under, 40%, 4½" and larger, 20%.

OLD MATERIAL

Dealers' Buying Prices.

	Per 100 Pounds. Montreal	Toronto
Copper, light	$15 00	$13 75
Copper, crucible	18 00	18 00
Copper, heavy	18 00	18 00
Copper wire	18 00	18 00
No. 1 machine composition	16 50	16 75
New brass cuttings	13 00	10 75
Red brass cuttings	14 50	14 75
Yellow brass turnings	9 00	9 00
Light brass	7 50	7 00
Medium brass	9 00	7 75
Scrap zinc	6 00	6 00
Heavy lead	5 00	5 25
Tea lead	3 75	3 50
Aluminum	18 00	18 00
	Per Ton.	Net
Heavy melting steel	13 50	13 50
Boiler plate	13 50	11 00
Axles (wrought iron)	20 00	20 00
Rails	14 50	13 50
Malleable scrap	15 00	17 00
No. 1 machine cast iron	21 00	18 00
Pipe, wrought	10 00	5 00
Car wheels	20 00	20 00
Steel axles	20 00	20 00
Mach. shop turnings	6 00	6 00
Stove plate	15 00	13 00
Cast boring	7 00	8 00

BOLTS, NUTS AND SCREWS

	Per Cent.
Carriage bolts, ⅜" and less	35
Carriage bolts, 7-16 and up	15
Coach and lag screws	50
Stove bolts	65
Wrought washers	50
Elevator bolts	25
Machine bolts, 7-16 and over	40
Machine bolts, ⅜" and less	40
Blank bolts	25
Bolt ends	25
Machine screws, fl. and rd. hd., steel	27½
Machine screws, o. and fil. hd., steel	10
Machine screws, fl. and rd. hd., brass	net
Machine screws, o. and fil. hd., brass	net
Nuts, square blank	add $0 75
Nuts, square, tapped	add 1 00
Nuts, hex., blank	add 1 00
Nuts, hex., tapped	add 1 25
Copper rivets and burrs, list less	15
Burrs only, list plus	25
Iron rivets and burrs	40 and 5
Boiler rivets, base ¾" and larger	$8 50
Structural rivets, as above	8 40
Wood screws, O. & R., bright	75
Wood screws, flat, bright	77½
Wood screws, flat, brass	55
Wood screws, O. & R., brass	55½
Wood screws, flat, bronze	50
Wood screws, O. & R., bronze	47½

MILLED PRODUCTS

(Prices on unbroken packages)

	Per Cent.
Set screws	50
Sq. and Hex. Head Cap Screws	45
Rd. and Fil. Head Cap Screws	20
Flat But. Hd. Cap Screws	10
Fin. and Semi-fin. nuts up to 1 in.	45
Fin. and Semi-fin. nuts, over 1 in., up to 1½ in.	40
Fin. and Semi-fin. nuts over 1½ in., up to 2 in.	25
Studs	30
Taper pins	50
Coupling bolts	10
Planer head bolts, without fillet, list	10
Planer head bolts, with fillet, list plus 10 and	net
Planer head bolt nuts, same as finished nuts.	
Planer bolt washers	net
Hollow set screws	net
Collar screws	list plus 20, 30
Thumb screws	40
Thumb nuts	75
Patch bolts	add 20
Cold pressed nuts to 1½ in.	add $1 00
Cold pressed nuts over 1½ in.	add 2 00

BILLETS

	Per gross ton
Bessemer billets	$38 50
Open-hearth billets	38 50
O.H. sheet bars	42 00
Forging billets	51 00
Wire rods	52 00

Government prices.

F.O.B. Pittsburgh.

NAILS AND SPIKES

Wire nails	$4 70
Cut nails	4 75
Miscellaneous wire nails	60%
Spikes, ⅜ in. and larger	$7 50
Spikes, ¼ and 5-16 in.	8 00

ROPE AND PACKINGS

Drilling cables, Manila	0 39
Plumbers' oakum, per lb.	0 10
Packing, square braided	0 38
Packing, No. 1 Italian	0 44
Packing, No. 2 Italian	0 36
Pure Manila rope	0 37
British Manila rope	0 31
New Zealand hemp	0 31
Transmission rope, Manila	0 43
Cotton rope, ¼-lb. and up	0 74

POLISHED DRILL ROD

Discount off list, Montreal and Toronto	net

MISCELLANEOUS

Solder, strictly	$ 0 34
Solder, guaranteed	0 39
Babbitt metals	18 to 70
Soldering coppers, lb.	0 58
Lead wool, per lb.	0 14
Putty, 100-lb. drums	6 75
White lead, pure, cwt.	17 80
Red dry lead, 100-lb. kegs, per cwt.	15 50
Glue, English	0 35
Tarred slater's paper, roll	1 30
Gasoline, per gal., bulk	0 33
Benzine, per gal., bulk	0 32
Pure turpentine, single bbls., gal.	1 50
Linseed oil, raw, single bbls.	2 90
Linseed oil, boiled, single bbls.	2 92
Plaster Paris, per bbl.	4 50
Sandpaper, B. & A.	List plus 43
Emery cloth	List plus 37½
Sal Soda	0 03½
Sulphur, rolls	0 05
Sulphur, commercial	0 04½
Rosin "D," per lb.	0 07
Rosin "G," per lb.	0 08
Borax crystal and granular	0 14
Wood alcohol, per gallon	2 00
Whiting, plain, per 100 lbs.	2 50

CARBON DRILLS AND REAMERS

S.S. drills, wire sizes up to 52	40
S.S. drills, wire sizes, No. 53 to 80	50
Standard drills, all sizes	50
3-fluted drills, plus	10
Jobbers' and letter sizes	50
Bit stock	40
Ratchet drills	15
S.S. drills for wood	40
Wood boring brace drills	25
Electricians' bits	30
Sockets	50
Sleeves	50
Taper pin reamers	net
Drills and countersinks	list plus 10
Bridge reamers	50
Centre reamers	10
Chucking reamers	net
Hand reamers	10
High speed drills, list plus 10 to	40
Canadian high speed cutters	net
American	plus 40

COLD ROLLED SHAFTING

At mill ..... list plus 5%
At warehouse ..... list plus 25%
Discounts off new list. Warehouse price at Montreal and Toronto

IRON PIPE FITTINGS

Malleable fittings, class A, 20% on list; class B and C, net list. Cast iron fittings, 15% off list. Malleable bushings, 25 and 7½%; cast bushings, 25%; unions, 45%; plugs, 20% off list. Net prices malleable fittings; class B black, 24½c lb.; class C black, 15¾c lb.; galvanized, class B, 34c lb.; class C, 24½c lb. F.O.B. Toronto.

SHEETS

	Montreal	Toronto
Sheets, black, No. 28	$ 6 55	$ 6 25
Sheets, black, No. 10	5 15	5 25
Canada plates, dull, 52 sheets	8 50	7 10
Can. plates, all bright.	8 50	8 00
Apollo brand, 10¾ oz. galvanized		
Queen's Head, 28 B.W.G.		
Fleur-de-Lis, 28 B.W.G.		
Gorbal's Best, No. 28		
Colborne Crown, No. 28.		
Premier, No. 28 U.S.		7 75
Premier, 10¾ oz.		8 05
Zinc sheets	20 00	20 00

PROOF COIL CHAIN

(Warehouse Prices)

B

¼ in., $13.00; 5-16, $11.00; ⅜ in., $10.00; 7-16 in., $9.80; ½ in., $9.75; ⅝ in., $9.20; ¾ in., $9.30; ⅞ in., $9.50; 1 in., $9.10; Extra for B.B. Chain, $1.20; Extra for B.B.B. Chain, $1.80.

ELECTRIC WELD COIL CHAIN B.B.

⅛ in., $16.75; 3-16 in., $15.40; ¼ in., $13.00; 5-16 in., $11.00; ⅜ in., $10.00; 7-16 in., $9.80; ½ in., $9.75; ⅝ in., $9.50; ¾ in., $9.30.

Prices per 100 lbs.

FILES AND RASPS

	Per Cent.
Globe	50
Vulcan	50
P.H. and Imperial	50
Nicholson	32½
Black Diamond	27½
J. Barton Smith, Eagle	50
McClelland, Globe	50
Delta Files	20
Disston	40
Whitman & Barnes	50
Great Western-American	50
Kearney & Foot, Arcade	50

BOILER TUBES.

Size	Seamless	Lapwelded
1 in.	$27 00	$
1¼ in.	29 00	
1½ in.	29 50	26 00
1¾ in.	32 00	26 00
2 in.	31 00	26 00
2¼ in.	35 00	28 00
2½ in.	43 00	32 00
3 in.	48 00	40 00
3½ in.		41 00
3½ in.	60 00	42 00
4 in.	75 00	56 00

Prices per 100 ft., Montreal and Toronto

OILS AND COMPOUNDS.

Castor oil, per lb.	
Royalite, per gal., bulk	22½
Palacine	25½
Machine oil, per gal.	36
Black oil, per gal.	16
Cylinder oil, Capital	62
Cylinder oil, Acme	45
Standard cutting compound, per lb.	0 06
Lard oil, per gal.	$2 60
Union thread cutting oil, antiseptic	88
Acme cutting oil, antiseptic	37½
Imperial quenching oil	39½
Petroleum fuel oil, bbls. net	8

BELTING—No 1 OAK TANNED

Extra heavy, single and double	30%
Standard	30, 10%
Cut leather lacing, No. 1	2 20
Leather in sides	1 75

TAPES

Chesterman Metallic, 50 ft.	$2 00
Lufkin Metallic, 603, 50 ft.	2 00
Admiral Steel Tape, 50 ft.	2 75
Admiral Steel Tape, 100 ft.	4 45
Major Jun. Steel Tape, 50 ft.	3 50
Rival Steel Tape, 50 ft.	2 75
Rival Steel Tape, 100 ft.	4 45
Reliable Jun. Steel Tape, 50 ft.	3 50

PLATING SUPPLIES

Polishing wheels, felt	4 00
Polishing wheels, bull-neck	2 25
Emery in kegs, American	06
Pumice, ground	06
Emery glue	35
Tripoli composition	09
Crocus composition	12
Emery composition	10
Rouge, silver	50
Rouge, powder, nickel	45

Prices per lb.

ARTIFICIAL CORUNDUM

Grits, 6 to 70 inclusive	**.08½**
Grits, 80 and finer	.6

BRASS—Warehouse Price

Brass rods, base ½ in. to 1 in. rod	**0 34**
Brass sheets, 24 gauge and heavier, base	$0 42
Brass tubing, seamless	0 46
Copper tubing, seamless	0 48

WASTE

XXX Extra	19½	Atlas	17
Peerless	19	X Empire	15½
Grand	18	Ideal	16
Superior	18	X Press	14
X L C R	17		

Colored

Lion	15	Popular	12
Standard	13½	Keen	10½
No. 1	13½		

Wool Packing

Arrow	25	Anvil	15
Axle	20	Anchor	11

Washed Wipers

Select White	11	Dark colored	09
Mixed colored	10		

This list subject to trade discount for quantity.

RUBBER BELTING

Standard ... 10% Best grades ... 15%

ANODES

Nickel	.58 to .65
Copper	.38 to .45
Tin	.70 to .70
Zinc	.18 to .18

Prices per lb.

COPPER PRODUCTS

	Montreal	Toronto
Bars, ½ to 2 in.	$42 50	$43 00
Copper wire, list plus 10		
Plain sheets, 14 oz., 14x60 in.	46 00	44 00
Copper sheet, tinned, 14x60, 14 oz.	48 00	48 00
Copper sheet, planished, 16 oz. base	46 00	45 00
Braziers', in sheets, 6 x 4 base	45 00	44 00

LEAD SHEETS

	Montreal	Toronto
Sheets, 3 lbs. sq. ft.	$10 25	$11 50
Sheets, 3½ lbs. sq. ft.	10 00	11 00
Sheets, 4 to 6 lbs. sq. ft.	9 75	10 50

Cut sheets, ½c per lb. extra.
Cut sheets to size, 1c per lb. extra.

PLATING CHEMICALS

Acid, boracic	$ .25
Acid, yhdrochloric	.04
Acid, nitric	.10
Acid, sulphuric	.04
Ammonia, aqua	.13
Ammonium, carbonate	.20
Ammonium, chloride	.22
Ammonium hydrosulpuret	.50
Ammonium sulphate	.30
Arsenic, white	.14
Copper, carbonate, annhy	.41
Copper, sulphate	.16
Cobalt, sulphate	.20
Iron perchloride	.62
Lead acetate	.30
Nickel ammonium sulpate	.16
Nickel carbonate	32
Nickel sulpate	18½
Potassium carbonate	.50
Potassium sulphide (substitute)	.42
Silver chloride (per oz.)	1.25
Silver nitrate (per oz.)	1.20
Sodium bisulphate	.18
Sodium carbonate crystals	.06
Sodium cyanide, 127-130%	.38
Sodium hyposulphite per 100 lbs	8.00
Sodium phosphate	.18
Tin chloride	1.75
Zinc chloride, C.P.	.30
Xinc sulphate	.08

Prices per lb. unless otherwise stated

The Week's Events in Montreal Industry

Roderic J. McLean, of Montreal, is expected home this week after a two months' business trip to England and Scotland.

* * *

The Hofmann-Sproul Company, of Philadelphia, Pa., are in the market for the purchase of considerable tonnage of machine shop turnings from Canadian sources.

* * *

The Canadian Ingersoll-Rand Com-Company, of Sherbrooke, P.Q., has secured the sole Canadian manufacturing and selling rights for the Wellman-Seaver-Morgan Company of Cleveland, Ohio, makers of large turbines for hydro-electric development. Machines for the Canadian market will now be made at the Sherbrooke plant.

* * *

If present plans materialize the amateur athletes among the employees of the Canadian Vickers Company of Montreal will form an organization and construct a large club house that will be provided with every modern convenience for the comfort of the members. A location as close as possible to the works will be acquired.

* * *

One of the recent enterprises for developing Canadian export trade is the formation of a corporation in London, England, known as Shawinigan Ltd. The chairman of the newly-organized company is H. T. Meldrum, of Montreal, and the vice-chairman is S. Ray Marshall, of London Howard Murray, of Montreal, is one of the directors.

* * *

The A. Bernard Industrial Company, of Fortierville, Que., have established a warehouse and service station at 36 Youville Square, Montreal, where a large stock of Bernard wood split pulleys and other power transmission supplies will be carried in stock for immediate delivery. B. Trudel & Co. will have charge of this branch and will be the authorized agents for the district.

* * *

The 1919-20 season of the Montreal branch of the Engineering Institute of Canada was opened on the evening of the 16th, at which a talk on malleable iron was given by W. G. Dauncey, C.E. The subject was ably treated by the speaker, and the fact was impressed upon the hearers that malleable iron had a distinct place in metallurgy, and should not be regarded as a rival of wrought iron, cast iron, or steel.

* * *

On Saturday of last week the "Canadian Navigator" was successfully launched from the yard of the Canadian Vickers Company. This vessel has a deadweight capacity of about 4,350 tons, and is the sixth vessel built by this company for the Canadian Government. The boat will have a length between perpendiculars of 320 feet, a beam of 44 feet, and a moulded depth of 25 feet. When the vessel has been fitted out she will take on a cargo for Liverpool.

* * *

Considerable congestion has taken place during the past few weeks in the harbor of Montreal owing to the inability of transferring the grain from the lake boats to the elevators, the latter being filled to capacity. The British labor situation has prevented regular ocean shipments, so that many vessels coming down the lakes with grain had to lie some time in port before they could get a chance to discharge their cargoes. Better conditions are looked for from now on.

* * *

A large Canadian manufacturer of air compressors states that the demand for this class of equipment at the present time is quite heavy. They state that during two weeks of September they disposed of fourteen machines, and the demand continues active. It is just recently that the inquiries for new compressors have been of any volume, as for the past year or more the trading in second-hand equipment has prevented an active market in new machines.

* * *

Unless something develops to upset the present plans for stable reconstruction work next year we can look for considerable progress in the expansion of Inter-British trade between the Mother Country and the various Dominions. Already several of these have established associations of manufacturers, to further this trade, and all the others are falling into line. One factor of after-the-war trading that is of special interest is the business of approximately $40,000,000 that Canada has done with Greece.

* * *

That steps are being taken to relieve the shortage of ocean tonnage is shown in the recent announcement of A. G. Henderson, one of the Glasgow directors of the Cunard and Anchor lines, when he stated that quite a number of vessels were now under construction for the Atlantic trade of his company. In addition to providing increased tonnage for old trade routes, the companies are preparing for other new routes as post-war requirements demand. Mr. Henderson intimated that some of these new boats would probably be ready for the Montreal route for the opening of the season of 1920.

* * *

Owing to the fact that Place D'Armes, in the heart of the business district of Montreal, is the chief transfer point of the Montreal Tramways system, and frequently occasions long waits for cars, the building of a kiosk on the square is under construction. This is for the protection of the public from the inclement weather—not from the increased fares. As a matter of fact the company propose using it as a depot where the public (at least those who can afford to ride) will be able to buy tickets and get change, as the new basic rate of a 7-cent cash fare will require considerable more mental bookkeeping on the part of the tram officials.

* * *

That Canada will benefit in some of the rehabilitation of world commerce may be gathered from the activities of Timber Operators and Contractors, Ltd., a company which was organized some months ago in England by a number of officers and men of the Canadian Forestry Corps. In addition to acting as agents for Canadian timber firms, this company has acquired the Priddy and Hale plant at Rotherhithe, Surrey Docks, and are erecting a creosoting plant, and will likely erect a sash and door factory. The company is also anticipating operations in Siberia and other portions of Europe. The capital invested is two and a half million dollars, and Major Alex. McDougal, formerly general officer in command of the Canadian Forestry Corps, is president of the company.

* * *

The importance of the engineering fraternity as a national asset to the country was impressed upon the members of the Montreal Rotary Club, at their luncheon last week, when Rotarian F. S. Keith was the principal speaker. Mr. Keith dwelt on the good work that had been accomplished by the Canadian Engineers during the war, and expressed the belief that their training would enable them, if opportunity offered, to solve many problems now facing the country. In speaking of the labor unrest, he said: "The problem of capital and labor would never be solved by either one of them, nor by lawyers, because they lacked the constructive trend of mind. Nor would it be solved by the average politician, because he lacked the creative ability. The type of mind that could successfully cope with the situation was the engineer's who always worked back to first principles."

* * *

Further impetus is given to the activities of Canadian interests in the incorporation of the International Corporation of Canada, with head offices at 112 St. Francois Xavier St., Montreal, with a capital of $2,000,000. While the primary object of the company is to trade in products made by Canadian manufacturers, the scope of their activities will be world-wide, as it is their intention to establish agencies in all the principal countries of the world, not only to look after the interests of Canada but likewise to develop trade in all parts of the Empire, backed entirely by Canadian capital. The gentlemen associated with the enterprise are prominent in Canadian financial and industrial activities, and is is expected shortly that a further announcement of the names of the directors will be made. It is understood that H. B. Thomson, formerly Canadian Food Controller, will occupy an executive position with the new company.

No. 4—Inclinable Open Back Press.

Consolidated Presses

represent the highest grade in quality of material, design and workmanship, and have many exclusive features which make for economy in operation, notably the three locking points in the hubs of all flywheels, giving 20 per cent. more production than any press having only two locking points in flywheel to engage clutch.

PRESSES FOR MARKING FUSES, FOR FUSE BODIES, FOR BLANKING, CUPPING AND DRAWING CARTRIDGE CASES.

Also a general line of Punch and Inclinable Presses.

Manufactured by

The Consolidated Press Co.
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Get our beautifully illustrated catalog for all the fine points of "consolidated" construction.

Nos. 0, 2½, 3 and 4 carried in stock at Toronto.

The A. R. Williams Machinery Co., Limited
TORONTO, ONTARIO

Acid Electric STEEL CASTINGS

Acid Electric Steel Castings show superior ability to resist wear and crystallization. They are smooth in texture, free from Blow Holes, and machine perfectly. We specialize in

Railroad and Other High Grade Castings

up to 15 tons, any specification. Electric Steel Castings COST NO MORE than ordinary Steel Castings.

Prices on Application—Prompt Deliveries

The Thos. Davidson Mfg. Co., Limited
Steel Foundry Division, Lachine Canal
Head Office: 187 Delisle St. MONTREAL
Phone Victoria 1492

MORROW SCREWS MORROW

MORROW

Twist Drills are not equalled by any other make. "*More holes with less regrinding.*" Insist on *your* jobber selling you "*Morrow*" products *Drills, Screws, Nuts.* The better kind.

John Morrow Screw & Nut Company, Limited
Ingersoll - Canada

Ingersoll Files Cut Faster and Wear Longer

DRILLS FILES MORROW MORROW NUTS MORROW

If interested tear out this page and place with letters to be answered.

U.S. SCRAP METAL

Western dealers are coming into the Eastern market, offering machine shop turnings at low prices. While in some parts the demand is active, in other business is quiet. Prices are generally firm. Following are reports from U. S. points:

Chicago.—Cast scrap, and iron and steel scrap of rolling mill grades are in good demand, and prices have shown an advance. Dealers are unable to ship stock sold on contracts owing to embargoes on shipments. Railroads are offering about 5,000 tons.

Boston.—Heavy melting steel has been bought pretty widely, and the price has advanced and continues on the up grade. Rerolling rails, stove plate, No. 1 machinery, and borings have shared in the movement. Pipe scrap shows the only drop, being quoted at $14 to dealers in Boston.

New York.—The market is quiet, though there has been some activity in heavy melting steel. Prices remain about the same, with the exception of clean cast borings, which have been advanced $1.

Philadelphia.—Western dealers who are unable to sell to their regular customers, are offering machine shop turnings at low prices in the East. A large tonnage was sold to an Eastern interest at 75 cents under the market. Wrought pipe is weak, there being no demand. Other grades are firm.

Pittsburgh.—Demand for scrap iron and steel is weak, and embargoes are preventing dealers from shipping material against contract. Dealers are looking for a better market as soon as the strike is settled.

Buffalo.—Sales are not numerous, and what there are for small lots. Prices are nominal, and there are few changes. Cast and stove plate are in good demand, and demands for borings particularly good.

Cleveland.—Trading is expected to remain quiet for some little time. There is a large amount of scrap on tracks, which will take some time to clear away when mills resume normal operations.

Cincinnati.—There is a large amount of material on stock in yards, and car shortages are operating against shipments. Steel scrap quotations are nominal, the market being very weak.

St. Louis.—Mills and foundries in this district are busy, and demand for scrap is steady. Rolling mill grades are strong. Cast scrap is about 50 cents higher.

"We're saving fuel," remarked the lady. "I just left my husband stamping on the floor to keep his feet warm."

"Thrift stamps, eh?" said her waggish friend.—Boston Transcript.

PIG IRON TRADE

Most Eastern furnaces are booked up for this year, and demand for spot iron is strong. This has led to a rise in price in some districts. Good enquiry for export iron is in evidence:

Philadelphia.—There is a good demand for prompt tonnages, a good deal of which is from New England consumers who cannot procure iron in their own district. Prices are strong, No. 2X being offered at $31 to $32 Eastern Pennsylvania furnace.

Boston.—With Buffalo furnaces practically sold up for this year's delivery, spot iron has stiffened. One or two furnaces are offering iron for first quarter, but this is the exception, and prices on this iron have advanced $1. Sales have averaged about the same as last week.

New York.—Big orders and enquiries for both basic and foundry iron for Japan have been in evidence during the week. One order for 5,000 tons basic brought up the total sales of this grade to Japanese interests in the past ten days to 10,000 tons. England, Belgium and Scandinavia are also in the market.

Pittsburgh. — Following large purchases of basic and bessemer by the Steel Corporation, amounting to probably 60,000 tons, a number of stocks have been blown in by Steel Corporation subsidiaries. Business has been small and in small lots the last few days. Carnegie has now 35 furnaces in blast, as compared with 20 during the early part of the strike.

Buffalo.—There is good enquiry in this district, but furnaces are not rushing to take orders. Some tonnage for 1920 has been booked. Prices are expected to rise after the strike is settled.

Cleveland.—The demand for spot iron from melters who are running short has resulted in stiffening prices. $30 furnace for 2.25 to 2.75 silicon has been offered, and a sale of 1,000 tons malleable at $28 Buffalo made. Steel making iron is not moving.

Call Off the Dogs

PRICES
HOW THE SAM HILL DO YOU EXPECT ME TO MAKE IT COME DOWN IF YOU KEEP SCARING THE LIFE OUT OF IT?
CURTAILED OUTPUT
LABOR DEMANDS
PUBLIC IMPATIENCE
PUBLIC
EVERYBODY'S AMBITION TO GET RICH WITHOUT WORK

Philadelphia North American

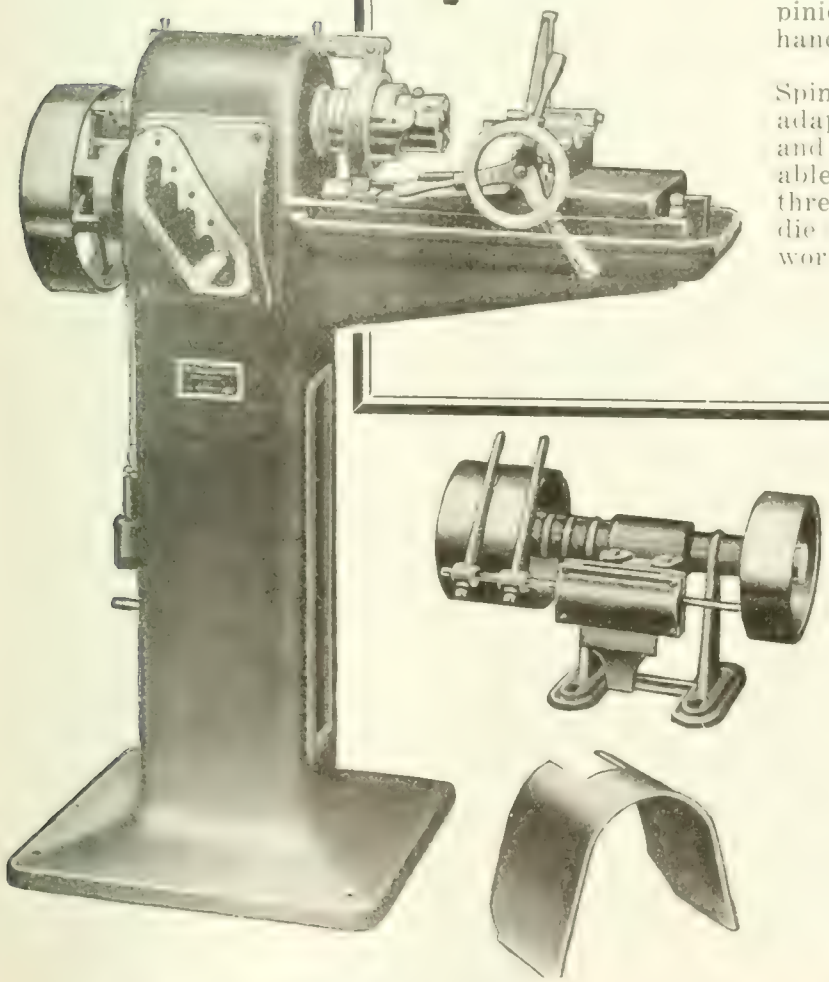
THE GEOMETRIC WAY

Where quantity and exactness have to be considered, the Geometric Threading Machine is just the way that suits. These machines have been tested and proved over and over again on speed, accuracy and endurance.

Geometric Threading Machines are employed on a large class of small threaded parts that cannot be produced economically on the ordinary screw machine.

Made in three sizes—to cut ⅛ to ½ inch, ¼ to ¾ inch, and ¾ to 1½ inch diameter threads. The carriage is mounted on slides and on the largest size machine is moved back and forth by rack and pinion, and in the smaller sizes by hand.

Spindle speed changes readily made, adapting the machine to the diameter and material of the work. An adjustable stop assures accurate length of thread, and automatically opens the die head, permitting of drawing the work straight back.



A line from you brings full details regarding this machine. Tell us your threading requirements—let us recommend the proper Geometric Collapsing Tap or Self-opening die.

THE GEOMETRIC TOOL COMPANY
NEW HAVEN CONNECTICUT

Canadian Agents :

Williams & Wilson, Ltd., Montreal. The A. R. Williams Machinery Co., Ltd., Toronto, Winnipeg, St. John, N.B.

Canadian Fairbanks-Morse Co., Ltd., Manitoba, Saskatchewan, Alberta.

If interested tear out this page and place with letters to be answered.

THE MIND OF THE FOREIGNER

(Continued from page 419)

been possible for the last twenty years to hear the doctrine of capitalistic exploitation preached openly in its most vicious form, with nothing done to meet the campaign.

The politicians wanted the votes of those men wherever they could get them, and they were not going to do anything that should alienate this support.

The strikes of foreigners this year may work out for lasting good if they have the effect of making the men in charge of affairs in this country and United States get seriously to work to find out what is back of it all, and what must be done in the way of corrective propaganda.

There must be something more than mere opposition to the agitator. There must be something that will cut the ground from under his feet. Rooting out the agitator is of little use in itself, as it simply places the halo of martyrdom on his miserable head, and leaves room for another to follow in his wake.

Foreigners who are in this country have a good chance to reach a better plane of living than was ever possible for them in the land they left. In return, all that is asked is that they mind their own business and cease trying to apply Marxian nonsense to a field where conditions do not call for it. Industry has a perfect right to insist that in return for decent working and living conditions, for the absence of the sweatshop, that it be placed in a position where it can go ahead with reasonable and definite assurance that it is not going to be sand-bagged and gassed at the say-so of the agitator, whose pockets bulge with teachings of anarchy, and the easy pickings he extracts from the hard-earned surplus of his victims.

Just by Way of Suggestion

IF the farmers are going to govern Ontario, let us give them a few good suggestions. Here they be, free of charge and guaranteed strictly fresh laid:—

1. That O'Connor be banished for trying to stick a peg in the price of eggs.

2. That any person selling butter for less than $1.50 a pound be shot at sunrise.

3. That any person from the city driving a car through the country shall not exceed a speed limit of three miles an hour, and that he shall be preceded by a herald with a trumpet, a red flag and a drum.

4. That people from the farms be given the freedom of their Toronto relatives' spare bedrooms during Exhibition time, and that the custom of taking a basket of butter, eggs and chickens to such relatives be immediately done away with.

5. That the great question of "Where shall the hired man wash his feet?" be referred to the special committee on drainage and ventilation.

6. That there shall be at once added to the curriculum of all schools a course showing how to make a calf drink out of a tin pail.

Last week a note on this page told of the usual things done on Thanksgiving Day. This week a reader embellishes the page with a more elaborate diary of his day's journey:—

Got up 6 a.m.
Shaved ate
Took wife to station.
Went to office.
Man came in unexpectedly.
Morning work shot to pieces
Went home
Put up blinds.
Dug up shrubs.
Bluffed neighbor into fixing the line fence.
Moved garden swing.
Piled lumber.
Tore down fence.
Dug up post
Filled in post hole.
Cleaned up cellar.
Played with the kids.
Ate supper.
Went four miles for junk.
Took home load of junk.
Unloaded load of junk.
Put kids to bed.
Took housekeeper and cousin for ride.
Smoked.
Yawned.
Retired tired but THANKFUL.

When Hallowe'en Comes Round

I CAN mind in days what's gone and never to return, when Hallowe'en come 'round each year our childish mind would burn, when we was told about the ride of famous Tam O'Shanter, a-tryin' to speed his old grey mare from out its Sunday canter. And we would sit with gapin' mouth—ah, yes, that tale is rich—about old Tam escapin' from the grabbin' of the witch.

But, then, in years that came along we turned to worser tricks, that savored much of cabbages, of night raids and of bricks.

And in them days we turned that night into one awful spree—in lookin' back to them there nights we'd swear it could not be. Why, I can hear John Cameron yet let out one awful roar, as we took his choicest cabbages and chucked 'em at his door.

But many of them things has passed and gone to be no more, when we was wicked youngsters in days what's gone before. And nowadays the youngsters' sport looks powerful meek and tame, the date's all right for Hallowe'en, but it hardly seems the same.

Imagine us wild-eyed galloots, when we was two-by-four, contented just to take a trip and ring at someone's door, or else to go and take a tub and duck for apples there, or gettin' taffy stuck, by gum, like glue into your hair.

Be gone the Hallowe'en that is, wheel back the good old kind, the sort that told of darin' deeds, of wild and woolly mind—when we was terrors for a night, when we shot up the block, when it took 'most a week of time to come back from the shock.

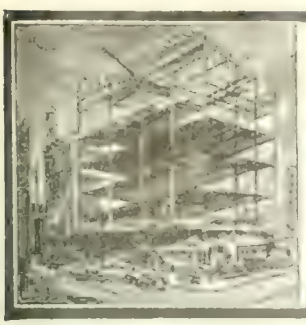
Yes, let me grab the hands of time, and grind 'em back a spell—for just pure joy at such a thing I'd bust right out an' yell. Oh, how I'd like to gather up them cabbages once more, and wave 'em up around my head, then slam 'em at the door. Old Cameron, yellin' after us, would be a joyful thing, 'twould make my heart and liver jump, and cause my bones to sing.

Of course, it's well that lots of folks don't think the same as me, but Hallowe'en, she aint the same as what she used to be.—ARK.

FROM a recent report on the subject we glean the interesting bit of information that "pseudowollastonite is the alpha form of calcium metascilicate." For our own part we'd never known before that any person could stay under water for such a long time.

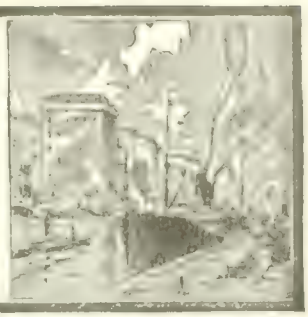
A DIFFICULT PROPOSITION

Customer—"I'd like to see a suit that would fit me."
Salesman—(absently)—"So would I."



INDUSTRIAL NEWS

NEW SHOPS, TENDERS AND CONTRACTS PERSONAL AND TRADE NOTES



MARINE

Buffalo.—The longshoremen's strike in New York is making itself felt at Lake ports, embargoes being placed on flour and other merchandise for export at the head of the lakes. Ore shipments down the lake to Buffalo have fallen off considerably, and little grain is being shipped.

Midland.—The Midland Shipbuilding Company have launched their third steamer for the Imperial Munition Board from their yard at Midland. The vessel launched recently was called the "War Fury," and was a full canal sized vessel of 3,400 tons, 261 feet by 46 feet 6 inches and 23 feet depth.

Detroit.—There is considerable congestion at Detroit owing to lack of unloading facilities at other ports due to strikes and threats of strikes. Approximately 4,065,000 tons of ore were detained in the river 24 hours or more, and this week 15 big ore carriers have been held up.

The "Canadian Seigneur," of the Canadian Government Merchant Marine, sailed last Friday on her maiden trip from Montreal to Liverpool, with a full cargo of grain, pulp, newsprint, sugar, meats and lumber. The "Canadian Seigneur" was launched at Vickers on May 17 last.

Halifax.—A message from the coast of Labrador speaks of the loss of the new tern schooner, "Team 16." The vessel was recently sold by A. Moulton & Company to Hon. P. Templeman, Newfoundland. She was launched from the yard at Conquerall Bank on August 27. The crew of six were all saved, and the value is fully covered by insurance.

New Glasgow. — The "Canadian Sealer" was launched from the yards of the Nova Scotia Steel & Coal Company recently. The vessel is of the 2,800 ton class, and has an overall length of 238 feet, and 35 feet beam. A sister vessel is on the ways, and another keel was laid immediately after the "Canadian Sealer" had vacated the berth.

Sydney, N.S.—The concrete schooner being built at North Sydney by Ivan Buyley and W. N. McDonald, has now progressed to the stage where the moulds are all complete and ready for pouring. Mr. Jones, Lloyd's inspector of steamships from New Glasgow, has arrived at North Sydney for the purpose of inspecting the work done so far on the vessel.

Work May Start Again.—Work on the Welland Canal, which has been stopped for several weeks, owing to labor disputes, may be resumed in the near future. The Minister of Labor is in favor of the work being resumed this winter on account of the probable amount of unemployment, and Dr. Reid, the Minister of Railways and Canals, is going to bring the matter before the Cabinet. The decision of the Cabinet will be accepted as final.

Belleville. — The schooner "Bertha Calkins" of Picton, commanded by Captain Van Dusen and bound for Belleville from Oswego with coal, foundered near Player's Cove in a heavy gale on Sunday night. The vessel opened a seam through straining in the heavy sea. The captain brought his vessel as close as possible to the shore before she sank, and the crew all reached the land in the ship's boat. She sank in 25 feet of water, and there is not thought to be much difficulty in raising her.

New Canadian Steamship Service.—The Marine Navigation of Canada is about to establish a direct service between Canada and Brazilian ports. They are having five steamers built in Holland for the service, and these vessels will be under the Canadian flag when completed. In order to foster Canadian trade with South America a subsidiary company is being formed under the name of the Canada Import and Export Company, with offices in the Coristine Building, Montreal. The first sailing from Montreal is expected to take place before navigation closes, and sailings will be made from St. John, N.B., during the winter. The company have a service between Montreal and St. Nazaire, France, which has been in existence for some years, with two steamers.

It is announced that Mr. F. J. Buller, the popular treasurer of the Canadian National Railways at Toronto, is resigning on the 15th of the month to accept the position of vice-president and manager of the Canadian Steel Tire & Wheel Co.

This company is associated with interests that occupy a very strong position in the railway equipment field and is constructing a plant of considerable magnitude at Montreal to manufacture steel tires for locomotives and passenger equipment. This means the creation of a new and important industry for Canada. So far all steel tires have been imported.

MR. F. J. BULLER.

Mr. Buller is a well-known figure in the railway and business world. He has been in the service of the Canadian Northern and Canadian National Railways Finance Department for nearly twenty years, where he has acquired a wide connection, which will prove valuable to him in the important position to which he now succeeds.

PERSONALS

Mr. T. A. Russell, of the Willys-Overland plant, is in the Canadian West at present.

Mr. F. C. Brunke, manager of the United States Steel Products Co., Toronto, leaves this week for New York to attend the meeting of the Iron and Steel Institute, in session there.

Mr. T. A. Hollinrake, president and general manager of the A. R. Williams Machinery Co., has returned to Toronto from an extended trip through Western Canada, as far as the Pacific Coast. Mr. Hollinrake called on a number of business houses, and on his return trip came

through via Fort George and Edmonton. Taken on the whole, conditions in Western Canada are sound and satisfactory, and Mr. Hollinrake believes that there is good business to be done there.

Mr. M. J. Butler, a well-known figure in engineering circles in Canada, and for some years managing director of Armstrong-Whitworth of Canada, has resigned that position. From 1905 to 1910 Mr. Butler was Deputy Minister and chief engineer of the Department of Railways and Canals, when he took up the duties of general manager with the Dominion Iron and Steel Co. and Dominion Coal Co. He severed his connection with these firms in 1912 when the Canadian branch of the famous Armstrong-Whitworth Co. was formed, organizing and becoming the managing director of the new firm.

TENDERS

The Department of Public Works of Canada is asking for tenders for the reconstruction of the breakwater at Collingwood, Ont., and tenders must be delivered before November 6, 1919. Plans and form of specifications can be obtained at the office of the District Engineers Equity Building, Toronto, and at the Post Office, Collingwood, and the Department, Ottawa.

TRADE GOSSIP

The Pennsylvania Crusher Company, Philadelphia, have issued bulletin No. 1004, descriptive of their hammer crushers adapted for the fine crushing of bituminous coal.

Railway Material. — The following cablegram, dated October 7, has been received from the Canadian High Commissioner in London, England: "Egyptian State railways in market for large quantities rails, fish-plates and steel ties." The Dept. of Trade and Commerce at Ottawa may be able to furnish the particulars required.

Making Automatics.—C. R. Burt, who was for some time in charge of the Russell Motor Co. works at King and Dufferin, during the early days of making munitions, has formed a partnership with Mr. Davenport, the inventor of a number of automatic machines. Together they have purchased a plant in Rochester for the manufacture of these machines. After leaving Toronto, Mr. Burt went to the Buffalo plant of the Russell Motor Co., being very successful in carrying out the work there, and getting the contract cleaned up to the satisfaction of the Government and the company.

Holding Up Building.—The steel situation in the United States is stated to be responsible for holding up the erection of the additions to the Holmes foundry on Exmouth street, Sarnia, this fall. Construction on the addition will not begin until the spring. This will have no effect with the opening of the plant now nearing completion, which will be ready to commence work within three weeks, according to Mr. Earl, superintendent at the plant at present.

The present building has, it is estimated, two hundred tons of structural steel in its construction. The plant will extend westward as far as the railway tracks when the different buildings are completed.

New Catalogue Out.—Butterfield and Company, of Rock Island, Quebec, have just issued two new catalogues, one on twist drills, gear and milling cutters, and the other on their line of taps, dies, screw plates, and various types of reamers. In addition to the general descriptive matter on the many lines of the company, each book contains an appendix that gives many rules, formulae and tables, relating to tap and drill sizes, cutting speeds, different thread types and dimensions, and other useful information.

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HAWK VANADIUM" TOOL STEEL

Remarkable in its glass Hardness, Toughness and Cutting Efficiency.

Will give twice the cut of a regular tool steel at one grinding.

Order "Hawk Vanadium" for your End Mills and cutters. Once known—always used.

Large Stock. Prompt Shipment.

Write for full particulars to

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Main Office and Warehouse:
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Steel cuses Malden Mass.

STEEL
OF EVERY DESCRIPTION
SEND US YOUR ENQUIRIES

A Drinking Water Service that will last a LIFETIME

What you pay for a few or in its leaking cups will meet the cost of the

PURO SANITARY DRINKING FOUNTAIN

(MADE IN CANADA)

DRINKING CUPS ARE UNSANITARY but the Puro delivers clean, fresh water at a reduction of 15% to 75% in water bill. "PURO" WILL SAFEGUARD THE HEALTH OF YOUR EMPLOYEES and protect your staff against disorganization by sickness.
Easily attached. Simply unscrew the cold air faucet and put on the "Puro."
Write us today for full information regarding the cost of installation of the PURO Sanitary Drinking Fountain Service.

Puro Sanitary Drinking Fountain Co.

Canadian Agents
McKENZIE BROS.
18 St. Alexis St., Montreal, P.Q.

ST. JOHN, N.B., NOTES

The plant of the Corona Company, Ltd., chocolate manufacturers, is to be doubled in capacity. Work is now going on in connection with the enlargement.

Machinery is now being installed in the premises of the Peerless Laundry Co., Ltd., 132 City Road, which has taken over the place formerly occupied by the Maritime Glass Works.

Two large steel tanks, 42 feet in diameter, 29 feet high, each with a capacity of 280,000 gallons, are to be erected by the Crosby Molasses Co., Ltd., at their plant here. The concrete foundations are now being laid by Grant & Horne, who have the contract.

A new hardwood last factory is being completed at Mullins' Brook, N.B., near McGivney Junction, owned by an English firm, with R. T. Baird, New Brunswick, manager. A mill plant is being moved from Napadogan to carry on the manufacturing and some 200 hands will be employed to engage in the industry.

St. John, N.B., Oct. 20, 1919. — The plant of the Provincial Line Co., Ltd., near Brockville, is being rapidly restored and the company is again carrying on its production. The plant was a heavy loser by fire a few months ago. When the new work has been completed, the plant will have a capacity of some 25,000 tons.

ONTARIO INCORPORATIONS

The Industrial Financial Corporation of Canada, Limited, has been incorporated under the Ontario Act, with a capitalization of $40,000 in 8,000 shares of $5 each, to carry on the business of financial brokers, auditors, registrars, etc. The head office will be in Toronto.

Dolomite Products, Limited, has been incorporated under the Provincial Act with a capital of $100,000 in 100,000 shares of $1 each. They will carry on the business of mining, smelting and manufacturing. The head office to be in Toronto.

Other Incorporations Are:—Greater Hamilton Development Co., Ltd., McLagan Furniture Co., Ltd., Sky Bros., Ltd., Turner Warehouse Co., Ltd., Sudsmen's Lithographic Co., Ltd., British Saskatchewan Gold Mines Limited, Gold Centre Mines, Ltd., Hudson Parker Sales Corporation, Ltd., Hamilton Hosiery Company, Ltd. The World Mining and Reduction Co., Ltd., H. Cooke & Co., Ltd., Rapid Electrotype Ltd., Ewart, Jacob & Byam Ltd., Albion Knitting Co., Ltd., Maple Leaf Milling Co., Ltd., Bruce Mines Trap Rock Co., Ltd., Wakinda Mines Ltd., Buckham Limited.

Alice: "It's quite a secret, but I was married last week to Dick Gray."

Jane: "Indeed, I should have thought you'd be the last person in the world to marry him."

Alice: "Well, I hope I am."—Edinburgh Scotsman.

BERTRAMS LIMITED
SCIENNES EDINBURGH
Machine Tools
FOR SHIPYARDS ETC

DIAMOND BRAND
OVENS
Japanning and Varnishing Ovens heated by Gas, Electricity, Steam or Coal. Kernchen Siphonage Ventilators, Bakers' Ovens, trucks, casters, etc. Write for Booklet
Brantford Oven & Rack Co., Ltd.
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BLACK DIAMOND BRAND

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SCALES
All standard patterns, also Combination Steel Scales and Reference Tables, carrying DECIMAL EQUIVALENTS OF FRACTIONS AND WIRE GAUGES, TAP AND DRILL SIZES OF ALL STANDARDS
Handy and Durable
THE LUFKIN RULE CO. OF CANADA, LTD.
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Seamless Brass and Copper Tubes
Including
Iron Pipe Sizes
also
Seamless Brass Condenser Tubes
Ready for Immediate Shipment
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NEW YORK WAREHOUSE
Also a complete line of Mechanical Cold Drawn Seamless Steel Tubing
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PORTABLE PLANERS
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OFFICE AND WORKS, MUSKEGON HEIGHTS U.S.A.

CASTINGS
Medium Weight Grey Iron, Brass, Etc.
JOBBING
GREENLEAFS, LIMITED
Belleville, Ontario

SAYS THE MASTER MECHANIC The Greb Automatic Grip Puller is a One-Man Puller—Quick-acting, strong and simple in the extreme. May be locked in any desired position. A combination of two or three arms. Heavy Duty Size capacity 1" to 18"—Junior size capacity 1" to 7". Two sets of jaws furnished with each size.
TEN DAYS' TRIAL.—If your dealer or jobber does not have them we will send you one. Try it ten days. If not satisfactory, return to us and we will refund your money. We also make the GREB RIM TOOL.
THE GREB CO., 318 State St., BOSTON

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ENGINEERS WANTED

To sell locally for firm of mechanical and electrical engineers, and secure inquiries for firm handling pumps and general power apparatus, on commission basis. Address

RODERICK J. McLEAN
128 Bleury St. Montreal

WANTED — FIRST-CLASS DIE SINKERS ON Automobile Drop Forge work. Apply stating experience and wages expected, to Canada Pole and Shaft Co., Ltd., Merritton, Ontario. (c19m)

WANTED MACHINE SHOP FOREMAN ACcustomed to light manufacturing, one with toolmaking experience preferred. Must be able to get results by training his own men. Machine shop equipment consists of Lathes, Cleveland Automatics, Gear Cutters, Drills, etc. State experience, salary expected and full information in first letter. Box 634, Canadian Machinery. (c19m)

GOOD OPENING FOR AMBITIOUS YOUNG man, graduate in Mechanical Engineering, preferably under thirty years of age. Canada Forge Company, Welland. (c19m)

MACHINE TOOL SALESMAN WANTED. Must have experience in both iron and woodworking machinery. Applications by mail only stating experience, etc. Canada Machinery Corporation, Limited, Galt, Ont. (c20m)

USED EQUIPMENT FOR SALE

3 McKENZIE 14" x 6" ENGINE LATHES, equipped with Universal Chucks; 1 Stevens Universal Grinder; 3 Acme 4-Spindle Automatics, capacity 3/8"; 1 24" x 10' Butler Planer; 1 No. 57½ Toledo Crank Press, equipped with Tie Rods; 1 Packard 30 H.P., 60 Cycle Motor, 55 Volts, 900 R.P.M.; 1 Brown Hoist, 15 ton, 4-Wheel Locomotive Crane, 45' Boom, Standard Gauge, equipped with 2-yd. Clam Shell Bucket. Address Box 635, Canadian Machinery. (c18m)

MACHINE WORK WANTED

MACHINE WORK WANTED FOR LATHES, shapers, milling machine and planer, etc. Hourly or contract basis. Prompt delivery. W. H. Sumbling Machinery Co., Toronto. (ctfm)

PATTERNS

TORONTO PATTERN WORKS, 65 JARVIS Street, Toronto. Patterns in wood and metal for all kinds of machinery. (cfm)

BRANTFORD PATTERN WORKS ARE PREpared to make up patterns of any kind—including marine works—to sketches, blue prints or sample castings. Prompt, efficient service. Bell 'Phone 631; Machine 'Phone 733. Brantford Pattern Works, 49 George St., Brantford, Ont. (ctfm)

Mining Machinery for Sale

Alley & McLellan Air Compressor 600 ft. at 100 lbs. pressure, 125 H.P. Motor, heavy duty 600 R.P.M. 3 phase 60 cycle 550 volts.
Ingersoll-Rand 800 ft. Air Compressor.
1 Tube Mill Fraser & Chalmers 5 x 22.
1 Power & Mining 5 x 22.
Also large assortment of Pumps, Tanks, Classifiers, Boilers and Mining Equipment for sale.

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402 McGill Building Montreal
1410 Royal Bank Bldg., Toronto, Ont.

BRASS ROD For Sale

At a Very Attractive Price

Free Turning

Round Brass Rod

Mill lengths of the following sizes:—	Diameter
30,000 lbs... .250"	¼"
24,500 lbs... .533"	Abt. .17/32"
62,500 lbs... .625"	⅝"
73,250 lbs... .750"	¾"
27,500 lbs... .9375"	15/16"
46,750 lbs...1.000"	1"
45,000 lbs...1,250"	1¼"
26,000 lbs...1.375"	1⅜"
39,000 lbs...2.000"	2"

Above is all new material stored at the manufacturers' plant in Connecticut, ready for prompt shipment and has passed Government inspection. **Address Box 625 Canadian Machinery.**

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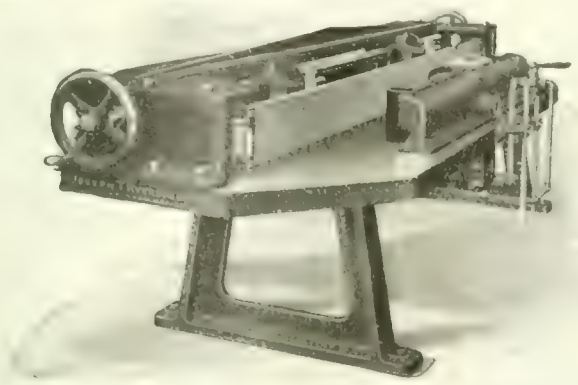

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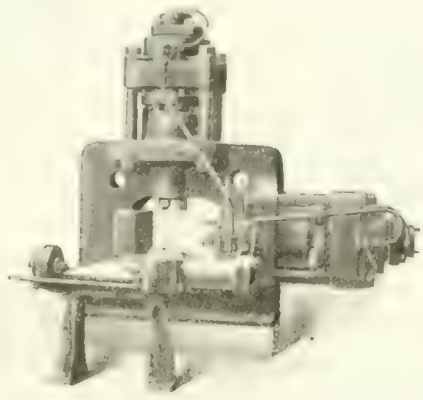

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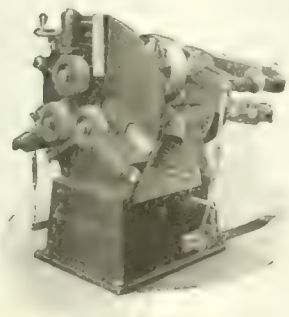
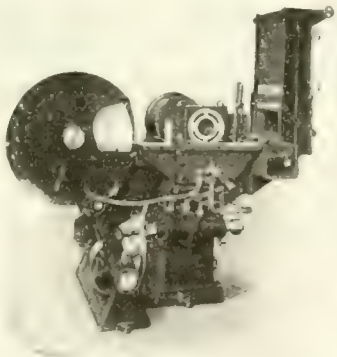


Ryerson Improved Universal Flue Cleaning Machine

This machine will clean and cut tubes, both standard and superheater sizes.



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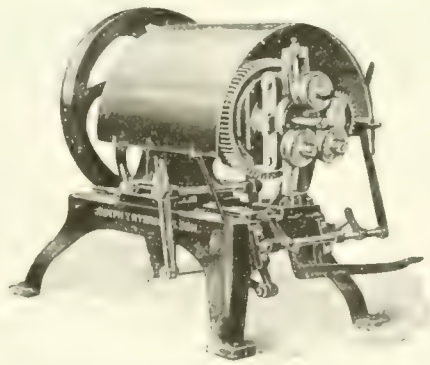

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3	10		GEN. ELEC.	4000-2000-240-120
1	10		CAN. GEN. ELEC.	2200-110-220
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4		15	CAN. GEN. ELEC.	550-110/220
2		15	WESTINGHOUSE	11000/575
1		15	WESTERN ELEC.	600-110/220
1		15	FT. WAYNE	1100/2200-110/220
		15	GEN. ELEC.	1040/2080
		15	GEN. ELEC.	2200-1980/110/220
1		15	PITTSBURG	1100/2200-110/220
1		15	WESTINGHOUSE	2200/1100-220/110
3		15	GEN. ELEC.	6600-550
2		15		2080-115/230
		15		2080-116/230
1	15		GEN. ELEC.	2080-230
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3		25		13200-2200
10		30	WESTINGHOUSE	11000-575
1		30	GEN. ELEC.	1040-2080-104-208
			GEN. ELEC.	2200/550-220/110
4		37½	WESTINGHOUSE	11000-575
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1		75	GEN. ELEC.	2250-375
1		90	WESTINGHOUSE	6600-2200
2		100	CAN. GEN. ELEC.	2200-550-220/110
2		100	WESTINGHOUSE	2200-11000
3		100	GEN. ELEC.	6800-1150/109
1	100		GEN. ELEC.	6600-200
2		100	WESTINGHOUSE	2400
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2		150	WESTINGHOUSE	2200-382
6		150		11000-2200
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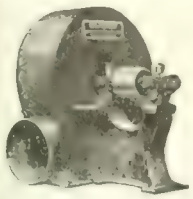
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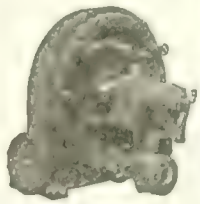
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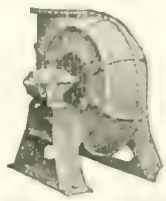
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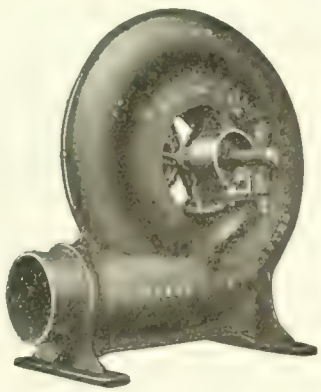

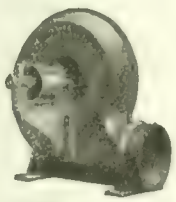
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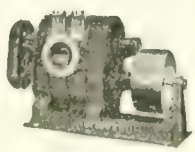
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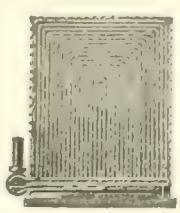
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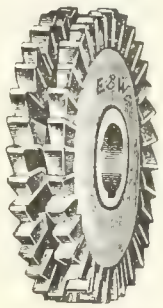

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1—No. 57 Toledo Crank Press, double back geared	24	24	300
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2—No. 87 Bliss Crank Presses, double back geared	16	27	250
2—No. 60½ Bliss Rack and Pinion Drawing Presses	60	21	100
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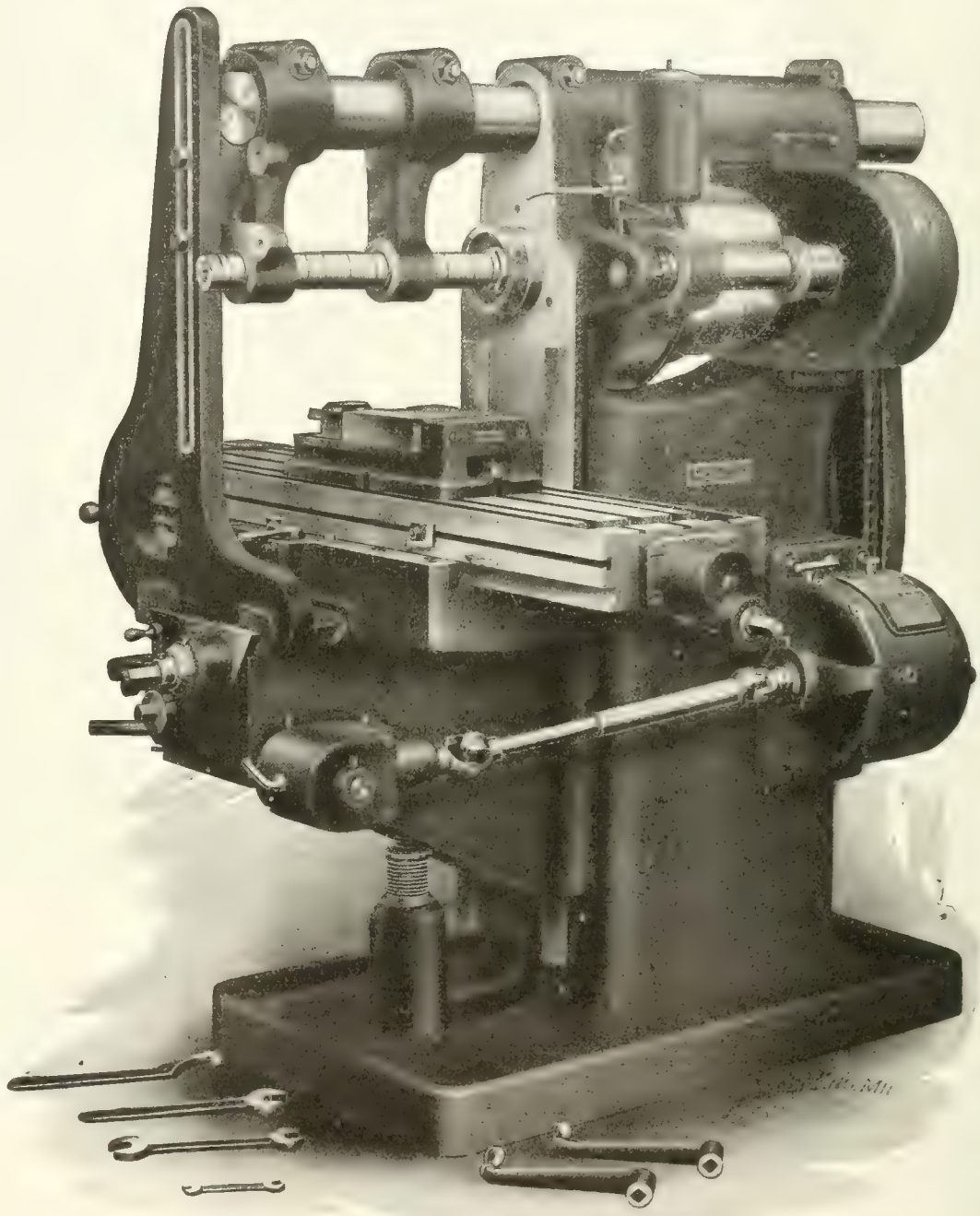

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Is the Alien a Menace?

IN the October issue of MACLEAN'S MAGAZINE a strong presentation is made of the reason why the people of the West are against further foreign immigration.

"The Menace of the Alien" depicts the foreign problem in the Canadian West as it exists to-day, and shows every one of us why we must Canadianize our Ruthenians, Austrians, Slovaks, and our fifty-seven other varieties before we allow any further "unrestricted" immigration.

This article is written by a member of MACLEAN'S MAGAZINE staff who has just returned from a careful, personal investigation of the situation. Shall we have a "White West?" Many Westerners are demanding it. Are the aliens to swing labor into the bosom of the O.B.U.? It is being done—and what must we do to stop it?

The "inside" story of the routing of the Drumheller miner aliens by returned Canadian war veterans is here told by MACLEAN'S for the first time. What leadership must be substituted for the O.B.U. leadership of these foreigners?

The October issue of MACLEAN'S is a Western number in the sense that it contains many articles and stories of distinctly Western interest. For instance:

X "Those Pesky Farmers Out West"

By Hopkins Moorhouse, Author of "Deep Furrows"

They have completely upset the old order of things. No longer will politics consist of the comfortable fight between the Ins and Outs with the old party lines maintained. The grain growers on the Prairies have upset the calculations of the professional politicians and completely changed the face of Dominion politics.

X "Fifty Years in the West"

By Professor W. T. Allison

A breezy and readable sketch of the business career of Winnipeg's veteran business man, James H. Ashdown.

"Further Discoveries of New Land"

By Vilhjalmur Stefansson

The final and most interesting instalment of Mr. Stefansson's story of his wonderful trip of five years' duration in the Canadian north in which he tells for the first time of finding new continents in the Arctic and hoisting there the Canadian flag.

X "The Banshee Bell"

By Edith G. Bayne

A bright love story laid in the mountains of British Columbia.

Other Splendid Features of October MacLean's

X "The Turmoil at Ottawa"

By J. K. Munro

A comprehensive survey of Dominion politics, written with complete impartiality and absolute candor. It is bright and breezy, with a knock in every line for the politicial opportunists. It plucks many tail feathers from our party leaders.

"Spanish Doubloons"

By Camilla Kenyon

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"The Airy Prince"

By Arthur Beverley Baxter

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"His Majesty's Well-Beloved"

By Baroness Orczy

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"Ebb and Flow"

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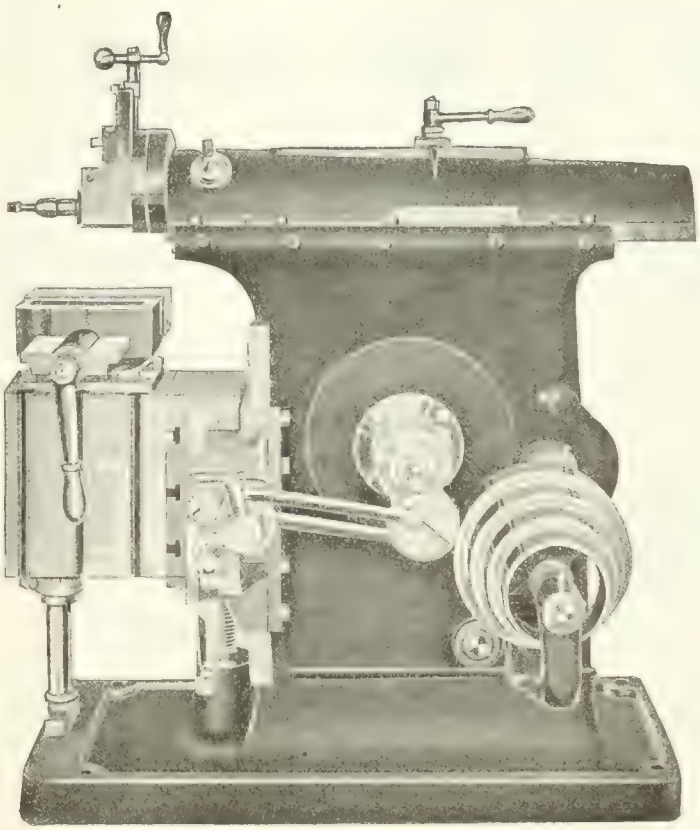

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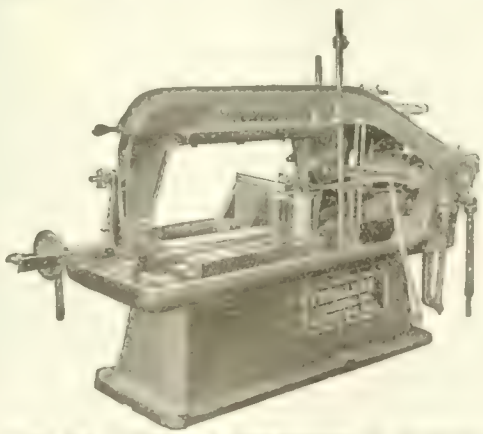

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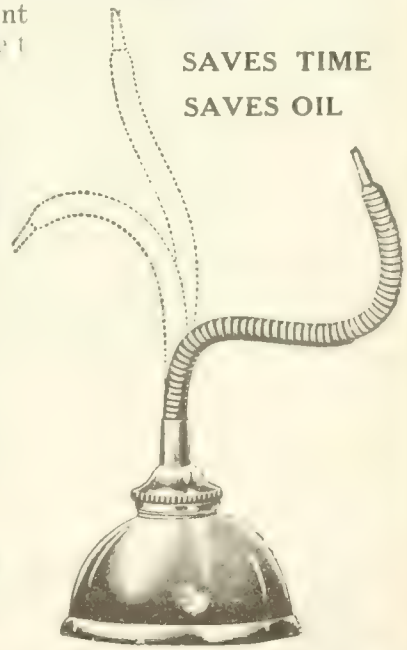

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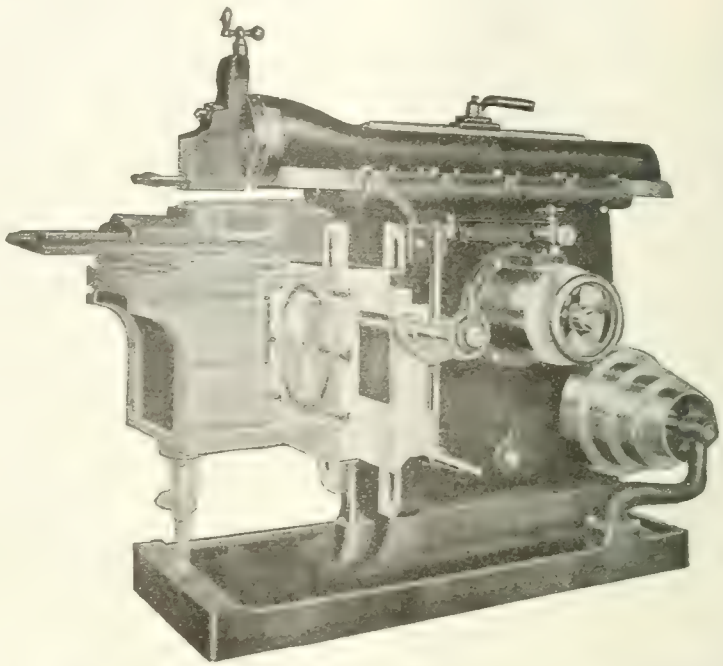

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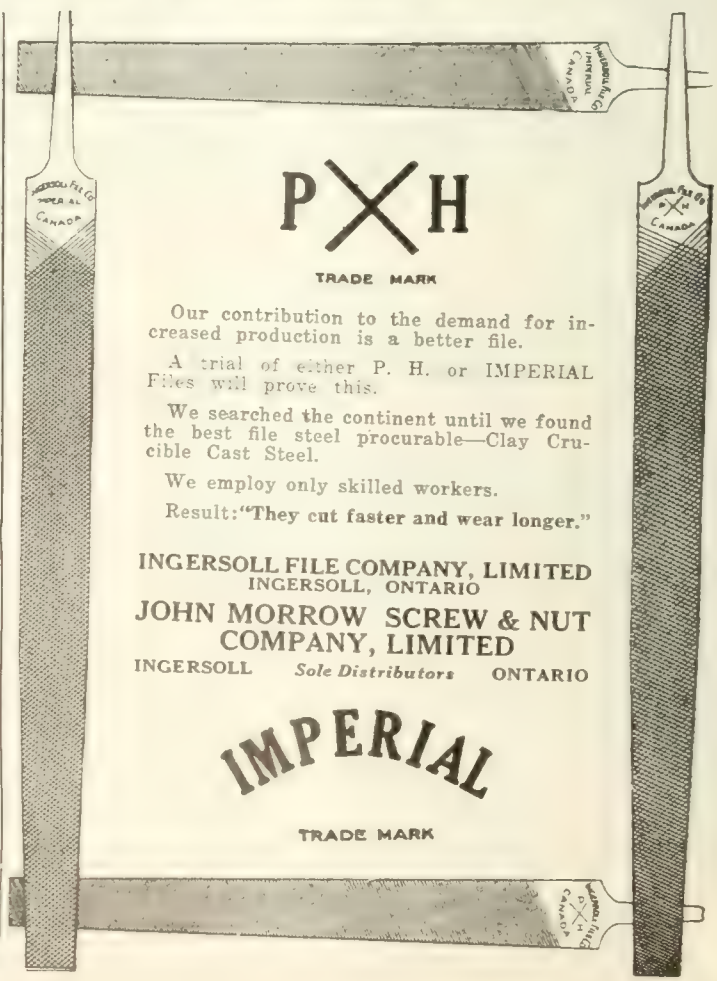

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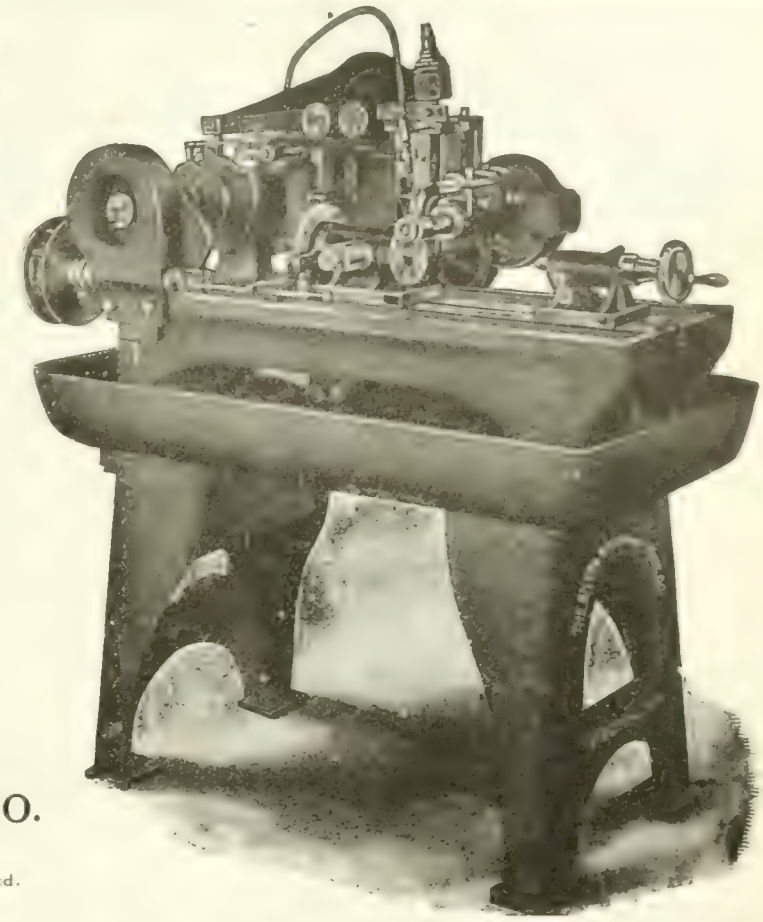

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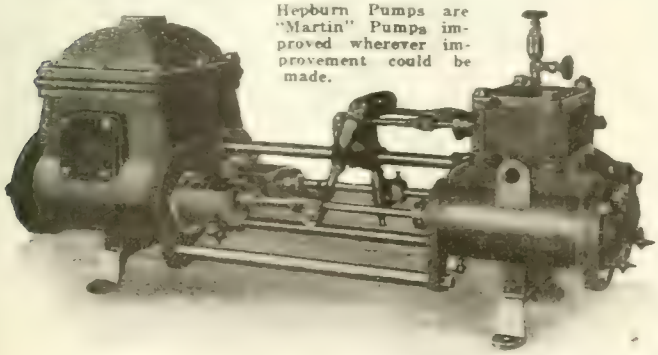

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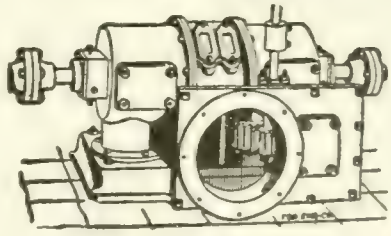

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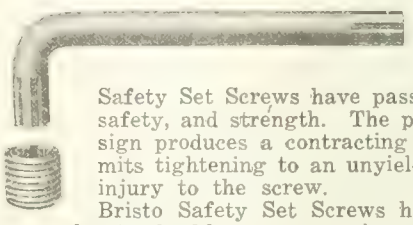

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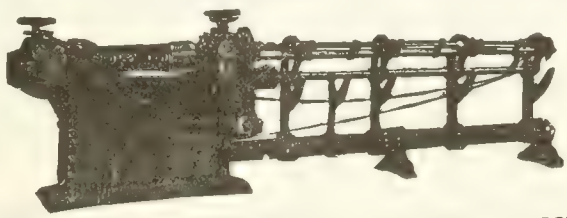

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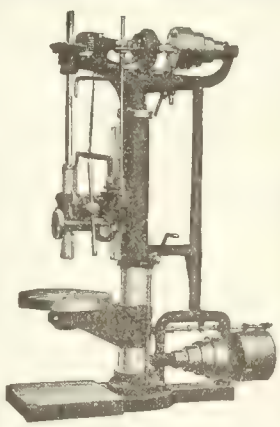

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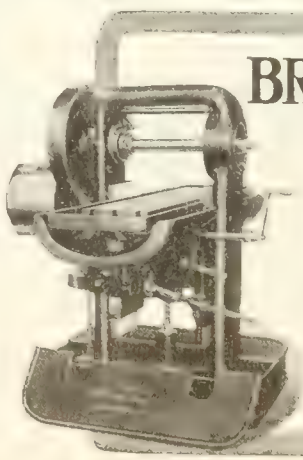

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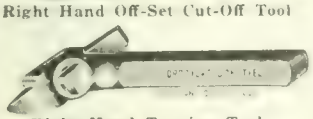

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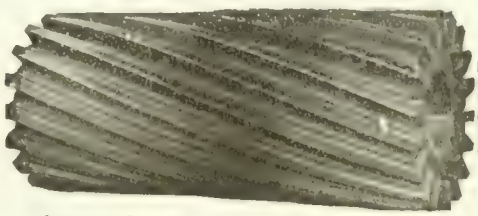

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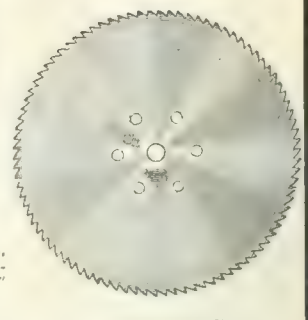

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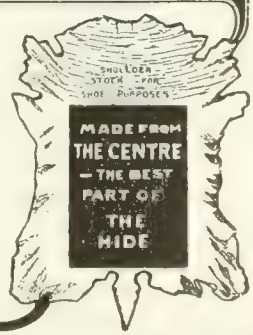

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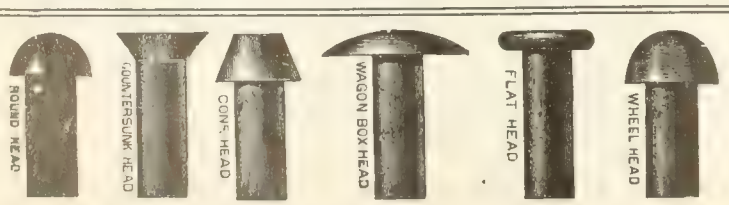

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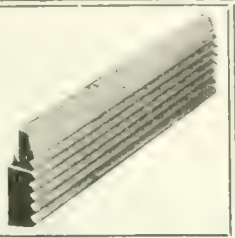

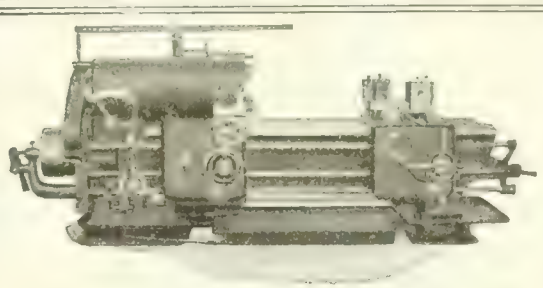

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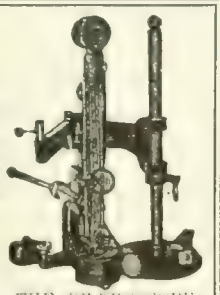

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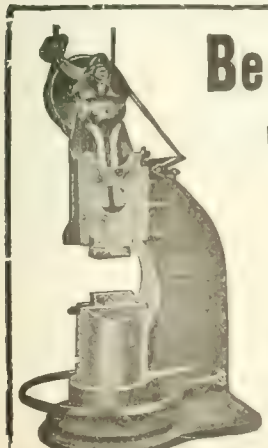

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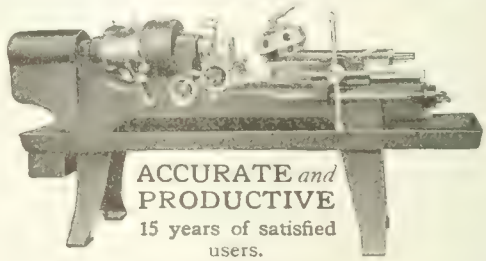

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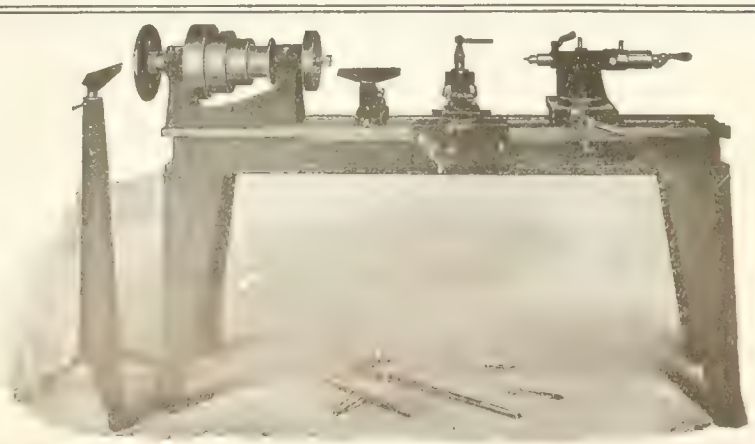

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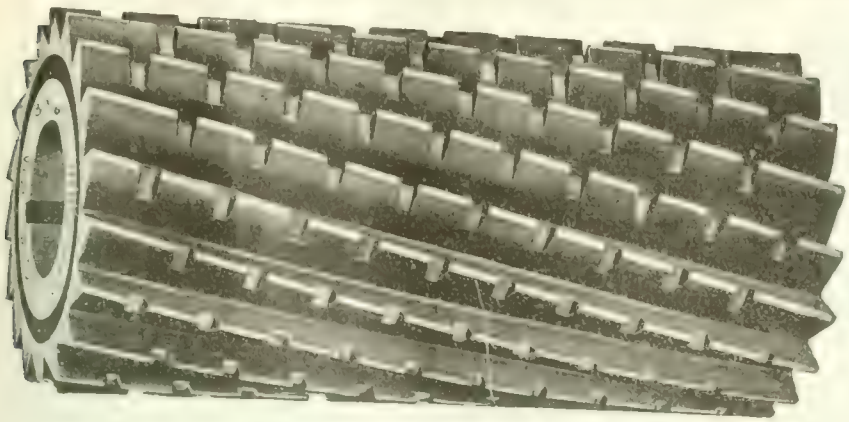

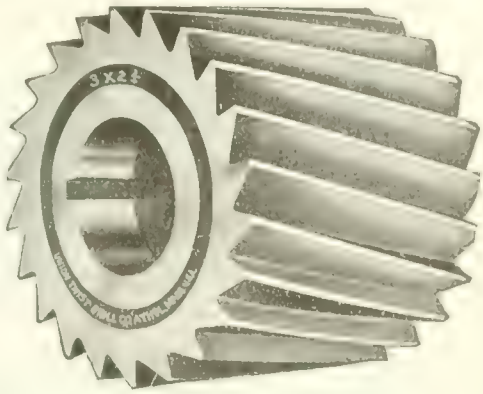

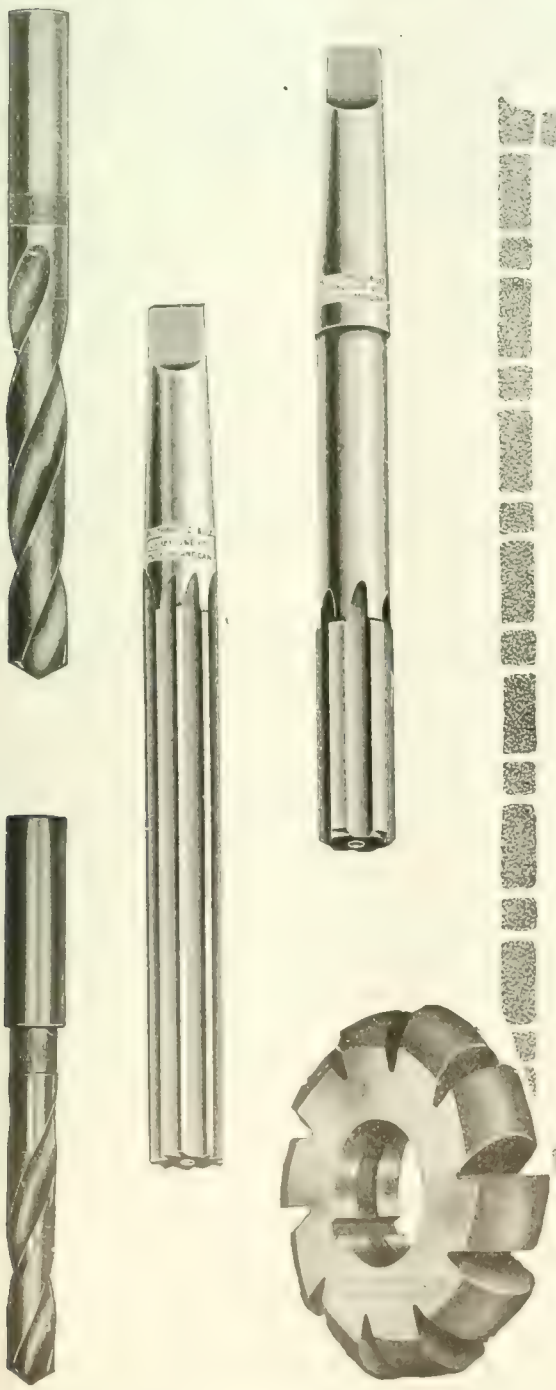

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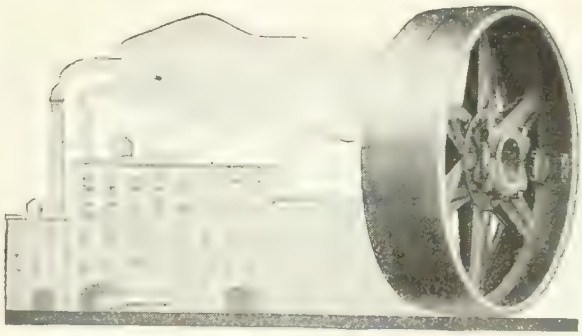

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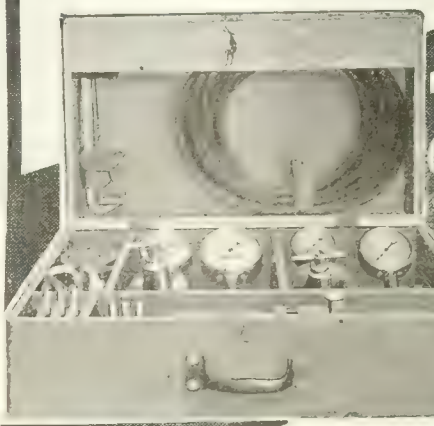

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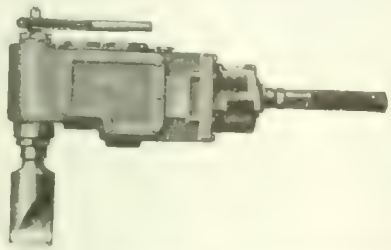

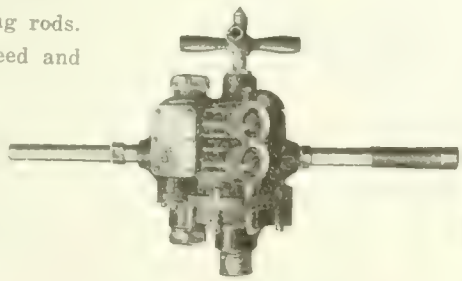

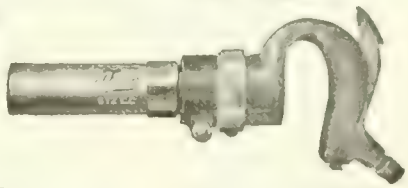

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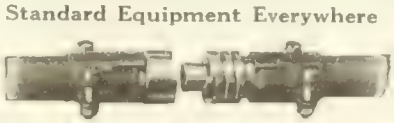

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Can. Blower & Forge Co., Kitchener, Ont
Canada Machinery Corp., Galt, Ont.
Can. Fairbanks-Morse Co., Montreal.
Foss Mchy. & S'ply Co., G. F., Montreal.
Garlock-Walker Mach. Co., Toronto.
Garvin Machine Co., New York.
Hoefer Mfg. Co., Freeport, Ill.
Henry & Wright Mfg. Co., Hartford, Conn
A. B. Jardine & Co., Hespeler, Ont.
Landis Tool Co., Waynesboro, Pa.
Nat. Automatic Tool Co., Richmond, Ind.
Niles-Bement-Pond Co., New York
Rockford Drilling Mach Co., Rockford, Ill

DRILLING MACHINES, RADIAL AND TURRET
John Bertram & Sons Co., Dundas.
Canadian Fairbanks-Morse Co., Montreal.
Canada Machinery Corp., Galt, Ont.
Garlock-Walker Machinery Co., Toronto.
Henry & Wright Mfg. Co., Hartford,
Landis Tool Co., Waynesboro, Pa.
Niles-Bement-Pond Co., New York.
Williams & Wilson, Limited, Montreal.

DRILLING MACHINES, SENSITIVE
Bilton Mach. Tool Co., Bridgeport, Conn.
W. F. & John Barnes Co., Rockford, Ill.
Canadian Fairbanks-Morse Co., Montreal.
Canadian Machinery Corp., Galt, Ont.
Geo. F. Foss Mch. & S'ply Co., Montreal
Garlock-Walker Mach. Co., Toronto, Ont.
Henry & Wright Mfg. Co., Hartford, Conn.
Landis Tool Co., Waynesboro, Pa.
Niles-Bement-Pond Co., New York.
Pratt & Whitney Co., Dundas, Ont.
United States Mach. Tool Co., Cincinnati
Williams & Wilson Limited, Montreal,

DRILLING MACHINES, UPRIGHT AND HORIZONTAL
Aurora Tool Works, Aurora, Ind
John Bertram & Sons Co., Dundas.
Garlock-Walker Mach. Co., Toronto, Ont
Can. Blower & Forge Co., Kitchener.
Canada Mach. Corp., Galt, Ont.
Ford-Smith Machine Co., Hamilton, Ont.
Garlock-Walker Mach. Co., Toronto, Ont.
Hoefer Mfg. Co., Freeport, Ill.
A. B. Jardine & Co., Hespeler, Ont.
Landis Tool Co., Waynesboro, Pa.
R. McDougall Co., Galt
Nat. Automatic Tool Co., Richmond, Ind.
Rockford Drilling Mach. Co., Rockford, Ill
Niles-Bement-Pond Co., New York.
Silver Mfg. Co, Salem, Ohio.
A. R. Williams Machinery Co., Toronto.
Williams & Wilson, Ltd., Montreal, Que.

DRILLING MACHINES, SPECIAL
Hoefer Mfg. Co., Freeport, Ill.

DRILLING MACHINES, WALL RADIAL
Lynd-Farquhar Co., Boston, Mass.
Wickes Bros, Saginaw, Mich.

DRILLING POSTS
Aikenhead Hardware Co., Toronto, Ont.
Keystone Mfg. Co., Buffalo, N.Y.
Rice Lewis & Son, Toronto, Ont.
Silver Mfg. Co., Salem, Ohio.

DRILLS, BENCH
Aikenhead Hardware Co., Toronto.
W. F. & John Barnes Co., Rockford, Ill
Can. Blower & Forge Co., Kitchener.
Can. Fairbanks-Morse Co., Montreal.
Geo. F. Foss Mch. & S'ply Co., Montreal
Fry's (London), Ltd., London, England
Garlock-Walker Machinery Co., Toronto.
Pratt & Whitney Co., Dundas, Ont.
Rice Lewis & Son, Toronto, Ont.
U.S. Electrical Tool Co., Cincinnati, O.
Williams & Wilson, Ltd., Montreal, Que.

DRILLS, CENTRE
Aikenhead Hardware Co., Toronto, Ont.
Butterfield & Co., Inc., Rock Island, Que.
Cleveland Twist Drill Co., Cleveland.
Morrow Screw & Nut Co., John, Ingersoll
Morse Twist Drill & Machine Co., New Bedford, Mass.
Rice Lewis & Son, Toronto, Ont.
Whitman & Barnes Mfg. Co., Akron, O.
Wilt Twist Drill Co., of Can., Walkerville
Williams & Wilson, Ltd., Montreal, Que.

DRILLS, BLACKSMITH AND BIT STOCK
Aikenhead Hardware Co., Toronto, Ont.
Butterfield & Co., Inc., Rock Island, Que.
Can. Blower & Forge Co., Kitchener.
Cleveland Twist Drill Co., Cleveland.
Geo. F. Foss Mch. & S'ply Co., Montreal
A. B. Jardine & Co., Hespeler, Ont
Morrow Screw & Nut Co., John, Ingersoll
Morse Twist Drill & Mch. Co., New Bedford, Mass.
Rice Lewis & Son, Toronto, Ont.
Whitman & Barnes Mfg. Co., Akron, O.
Wilkinson & Kompass, Hamilton, Ont.
Wilt Twist Drill Co. of Can., Walkerville

DRILLS, CARBON
Atkins & Co., Ltd., Wm., Sheffield, Eng.
Butterfield & Co., Inc., Rock Island, Que.
Marshall, Son & Bunney, Toronto.
John Morrow Screw & Nut Co., Ingersoll

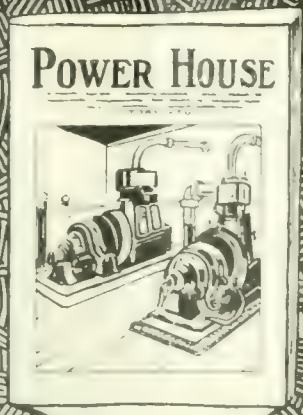
DRILLS, ELECTRIC, PORTABLE
Aikenhead Hardware Co., Toronto, Ont.
Can. Blower & Forge Co., Kitchener.
Boker & Co., Inc., H., Montreal, Que.
Cincinnati Electrical Tool Co., Cincinnati
Geo. F. Foss Mch. & S'ply Co., Montreal
Independent Pneumatic Tool Co., Chicago.
Niles-Bement-Pond Co., New York.
Pilot Steel & Tool Co., Montreal, Que.
Prest-O-Lite Co., Inc., Toronto, Ont.
U. S. Electrical Tool Co., Cincinnati, O.
A. R. Williams Mach. Co., Toronto.
Wilkinson & Kompass, Hamilton, Ont.
Williams & Wilson, Ltd., Montreal, Que.

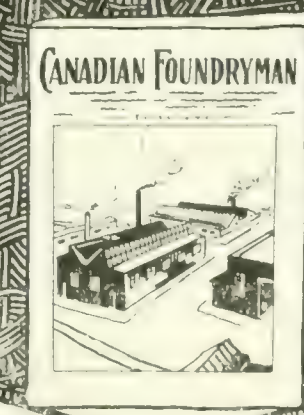
DRILLS, EMERY
Garlock-Walker Mach. Co., Toronto, Ont.

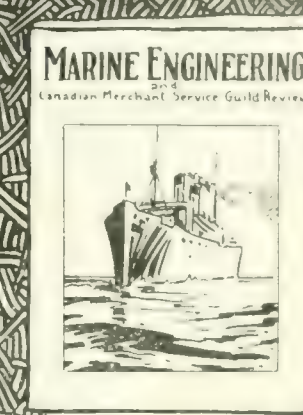
DRILLS, HIGH SPEED TWIST
Aikenhead Hardware Co., Toronto, Ont.
Armstrong-Whitworth of Can., Montreal.
Atkins & Co., Ltd., Wm., Sheffield, Eng.
Butterfield & Co., Rock Island, Que.
Cleveland Twist Drill Co., Cleveland.
Canadian Fairbanks-Morse Co., Montreal
H. A. Drury Co., Montreal.
Geo. F. Foss Mch. & S'ply Co. Montreal
Marshall, Son & Bunney, Toronto.
Morrow Screw & Nut Co., John, Ingersoll, Ont.
Morse Twist Drill & Machine Co., New Bedford, Mass.
W. F. & John Barnes Co., Rockford, Ill
Plewes, Ltd., Winnipeg, Man.
Pratt & Whitney Co., Dundas, Ont.
Rice Lewis & Son, Toronto, Ont.
Standard Machy. & Supplies, Montreal.
Taylor J. A. M., Stair Bldg., Toronto.
Whitman & Barnes Mfg. Co., Akron, O.
Wilt Twist Drill Co. of Can., Walkerville
Wilkinson & Kompass, Hamilton, Ont.
Williams & Wilson, Ltd., Montreal, Que

DRILLS, OIL TUBE
Butterfield & Co., Inc., Rock Island, Que.
Cleveland Twist Drill Co., Cleveland.
Morse Twist Drill & Mach. Co., New Bedford, Mass.
Rice Lewis & Son, Toronto, Ont.

DRILLS, PNEUMATIC
Can. Ingersoll-Rand Co., Montreal, Que.
Cleveland Pneumatic Tool Co., Toronto.
Independent Pneumatic Tool Co., Chicago.
Niles-Bement-Pond Co., New York.
Williams & Wilson, Limited, Montreal.







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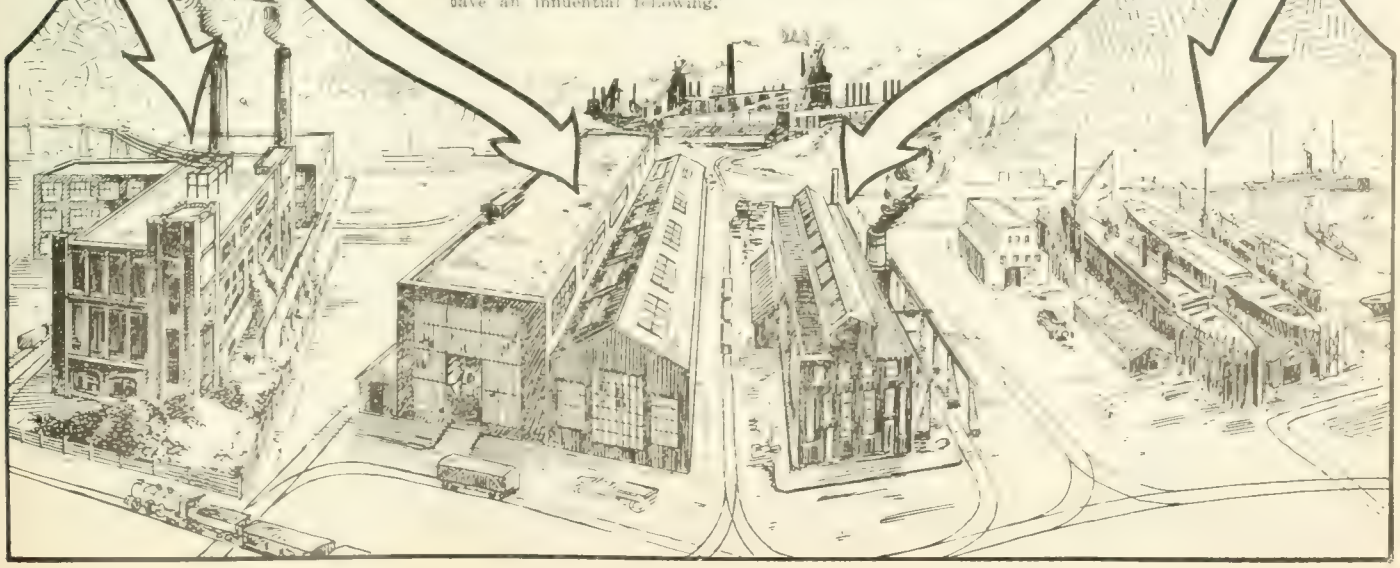

If interested tear out this page and place with letters to be answered.

DRILLS, PNEUMATIC CORNER
Can. Ingersoll-Rand Co., Montreal, Que.
Cleveland Pneumatic Tool Co. of Canada, Toronto
Garlock-Walker Machinery Co., Toronto.
Independent Pneumatic Tool Co., Chicago.

DRILLS, RATCHET AND HAND
Aikenhead Hardware Co., Toronto, Ont.
Armstrong Bros. Tool Co., Chicago, Ill.
Can. Blower & Forge Co., Kitchener, Ont.
Canadian Fairbanks-Morse Co., Montreal.
Cincinnati Electrical Tool Co., Cincinnati.
Cleveland Twist Drill Co., Cleveland.
Garlock-Walker Mchy. Co., Toronto, Ont.
A. B. Jardine & Co., Hespeler, Ont.
Morrow Screw & Nut Co., John, Ingersoll, Ont.
Morse Twist Drill & Mch. Co., New Bedford, Mass.
Pratt & Whitney Co., Dundas, Ont.
Rice Lewis & Son, Toronto, Ont.
Whitman & Barnes Mfg. Co., Akron, O.
Wilt Twist Drill Co. of Can., Walkerville.

DRILLS, ROCK
Can. Ingersoll-Rand Co., Montreal, Que.
Cleveland Pneumatic Tool Co., Toronto.
The Foss Mchy. & Supply Co., Montreal.
A. R. Williams Machy. Co., Toronto.

DRILLS, TRACK
Butterfield & Co., Inc., Rock Island, Que.
Cleveland Twist Drill Co., Cleveland.
The Foss Mchy. & Supply Co., Montreal.
Morrow Screw & Nut Co., J., Ingersoll, Ont
Morse Twist Drill & Mch. Co., New Bedford, Mass.
Wilt Twist Drill Co. of Can., Walkerville.

DRINKING FOUNTAINS, SANITARY
Puro Sanitary Drinking Fountain Co., Haydenville, Mass.

DRIVES, CHAIN
See Belting, Chain.

DRIVING TOOLS
The Thos. Pink Co., Ltd., Pembroke, Ont.

DRY CLEANING SYSTEM
Bowser Co., Ltd., S. F., Toronto, Ont.

DRYERS, SAND
Pangborn Corporation, Hagerstown, Md.

DRYING APPLIANCES
Baird Machine Co., Bridgeport, Conn.

DRUM CONTROLS
Volta Manufacturing Co., Welland, Ont.

DUMP CARS
Canadian Fairbanks-Morse Co., Montreal.
MacKinnon Steel Co., Sherbrooke, Que.

DUST EXHAUSTER. ARRESTER SYSTEM
Pangborn Corporation, Hagerstown, Md.

DUST HANDLING EQUIPMENT
Pangborn Corporation, Hagerstown, Md.

DUST SEPARATORS
Can. Blower & Forge Co., Kitchener, Ont.

DYNAMOS AND ELECTRICAL SUPPLIES
Canadian Fairbanks-Morse Co., Montreal.
Lancashire Dynamo & Motor Co., Ltd., Toronto.
MacGovern & Co., Montreal, Que.
A. R. Williams Machy. Co., Toronto.

ELECTRICAL SUPPLIES
Can. General Electric Co., Toronto, Ont.

ELECTRIC FURNACES
Volta Manufacturing Co., Welland, Ont.

EECTRIC FURNACE REGULATORS, WINCHES, ROOF COOLERS AND ELECTRODE HOLDERS
Volta Manufacturing Co., Welland, Ont.

ELECTRICAL RESISTANCE MATERIALS, NICHROME, KROMORE, CHROMAX, CLIMAX, NICKEL, SILVER, ADVANCE.
Can. Driver-Harris Co., Walkerville, Ont.

ELECTRIC HOISTS, STATIONARY AND MONO RAIL
Volta Manufacturing Co., Welland, Ont.

ELECTRIC MOTORS
Volta Manufacturing Co., Welland, Ont.

ELEVATOR, ENCLOSURES
Volta Mfg. Co., Welland, Ont.
Canada Wire & Iron Goods Co., Hamilton

ELEVATOR WEIGHTS
Katie Foundry, Galt, Ont.

ELEVATORS AND BUCKETS
Can. Link-Belt Co., Toronto, Ont.
Curtis Pneumatic Machy. Co., St. Louis.
Williams & Wilson, Ltd., Montreal, Que.

ELEVATING AND CONVEYING MACHINERY
Can. Link-Belt Co., Toronto, Ont.
Morris Crane & Hoist Co., Herbert, Niagara Falls, Ont.
Williams & Wilson, Ltd., Montreal, Que.

EMBOSSING PRESSES
Brown & Sharpe Mfg. Co., Grand Rapids, Mich

EMERY GRINDERS (PNEUMATIC)
Cleveland Pneumatic Tool Co., Toronto.
Ford-Smith Machine Co., Hamilton, Ont.

EMERY AND EMERY WHEELS
Brantford Emery Wheel Co., Brantford, Canada.
The Foss Mchy. & Supply Co., Montreal.
Garvin Machine Co., New York.
Canadian Fairbanks-Morse Co., Montreal.
Canada Emery Wheels Co., Hamilton.
Ford Smith Mach. Co., Hamilton, Ont.
Rice Lewis & Son, Toronto, Ont.
Standard Machy. & Supplies, Montreal.
Wilkinson & Kompass, Hamilton, Ont.
Williams & Wilson, Ltd., Montreal, Que.

EMERY WHEEL DRESSINGS
Wheel Truing Tool Co., Windsor, Ont.

END MILLS
John Morrow Screw & Nut Co., Ingersoll

ENGINEERS—INDUSTRIAL CLEANING (Free Consultation)
Oakite Chemical Co., New York, N.Y.

ENGINES, STEAM, GAS, GASOLINE
Canadian Fairbanks-Morse Co., Montreal.
Johnson Mach. Co., Carlyle, Manchester, Conn.
MacGovern & Co., Montreal, Que.

ENGINES, HORIZONTAL AND VERTICAL
Johnson Mach. Co., Carlyle, Manchester, Conn.
A. R. Williams Machy. Co., Toronto.
Williams & Wilson, Ltd., Montreal, Que.

ENGINES, MARINE
Can. Ingersoll-Rand Co., Sherbrooke, Que.

ENGRAVERS
Pritchard-Andrews Co., Ottawa.

ESCUTCHEON PINS
Parmenter & Bulloch, Gananoque, Ont.

EXHAUST HEADS AND HOODS
Can. Blower & Forge Co., Kitchener, Ont.
Canadian Fairbanks-Morse Co., Montreal.

EXHAUSTERS
Can. Blower & Forge Co., Kitchener, Ont.
Pangborn Corporation, Hagerstown, Md.
Williams & Wilson, Ltd., Montreal, Que.

EXTRACTORS, TAP
Walton Co., The, Hartford, Conn.

EYE BOLTS AND NUTS
Can. Foundries & Forgings, Ltd., Welland, Ont.

EYE PROTECTORS
Standard Optical Co., Geneva, N.Y.
Strong, Kennard & Nutt Co., Cleveland.
Willson & Co., Inc., T. A., Reading, Pa.

FACTORY GATES
Page Steel & Wire Co., Adrian, Mich.

FANS
Baird Machine Co., Bridgeport, Conn.
Can. Blower & Forge Co., Kitchener, Ont.

FENCING, WIRE
Page Steel & Wire Co., New York, N.Y.
Williams & Wilson, Ltd., Montreal, Que.

FENCE, IRON AND FACTORY
Can. Wire & Iron Goods, Hamilton, Ont.
Page Steel & Wire Co., Adrian, Mich.

FERRO-TUNGSTEN
Vanadium-Alloys Steel Co., Pittsburgh, Pa

FILES
Aikenhead Hardware Co., Toronto, Ont.
Atkins & Co., Wm., Sheffield, Eng.
Ingersoll File Co., Ltd., Ingersoll, Ont.
Morrow Screw & Nut Co., J., Ingersoll, Ont
Marshall, Son & Bunney, Toronto, Ont.
Nicholson File Co., Port Hope, Ont.
Rice Lewis & Son, Toronto, Ont.
Simonds Mfg. Co., Fitchburg, Mass.
Whitman & Barnes Mfg. Co., Akron, O.
Wilkinson & Kompass, Hamilton, Ont.

FILTERING AND CIRCULATING SYSTEMS FOR LUBRICATING OIL
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Can. Wire & Iron Goods, Hamilton, Ont.

FINISHING MACHINES
Brown & Sharpe Mfg. Co., Providence, R.I.

FIRST AID CABINETS
Strong, Kennard & Nutt Co., Cleveland.

FIRE EXTINGUISHERS
Strong, Kennard & Nutt Co., Cleveland, O.

FIXTURES
Brown Engineering Corp., Toronto, Ont.
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Illinois Tool Works, Chicago, Ill.
Marten Machine Co., Hamilton, Ontario.
Toronto Tool Co., Toronto, Ont.

FLAT SPRINGS
The Dunbar Brothers Co., Bristol, Conn.

FLANGING CLAMPS
Wickes Bros., Saginaw, Mich.

FLOTATION MACHINERY
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FLUMES
William Hamilton Co., Peterboro, Ont.

FORGES, HAND PORTABLE
Aikenhead Hardware Co., Toronto, Ont.
Can. Blower & Forge Co., Kitchener
A. B. Jardine & Co., Ltd., Hespeler, Ont.
Rice Lewis & Son, Toronto, Ont.

FORGINGS, STEEL AND IRON
Blancke Co., L. C., New York City

FORGINGS
Mesta Machine Co., Pittsburgh, Pa.
Can. Found. & Forgings, Ltd., Welland.
Nova Scotia Steel & Coal Co., New Glasgow, N.S.

FORGINGS, DROP, AUTOMOBILE AND LOCOMOTIVE FORGING AND WELDING
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Brown, Boggs Co., Ltd., Hamilton, Ont.
Canada Machinery Corp., Galt, Ont.
Garlock-Walker Machy. Co., Toronto, Ont.
National Machy. Co., Tiffin, Ohio.
Williams & Wilson, Ltd., Montreal, Que.

FORGINGS, SPECIAL
Armstrong-Whitworth of Can., Montreal.
Blancke Co., L. C., New York City
Can. Found. & Forgings, Ltd., Welland.
Williams & Co., J. H., Brooklyn, N.Y.

FORMING
Brown & Sharpe Mfg. Co., Providence, R.I.

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Puro Sanitary Drinking Fountain Co., Haydenville, Mass.

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Graton & Knight Mfg. Co., Montreal.

FRICTION SURFACE BELTING
Can. Consolidated Rubber Co., Montreal.

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Bowser Co., Ltd., S. F., Toronto, Ont.
Gilbert & Barker Mfg. Co., Springfield.

FURNACES, ANNEALING, CASE HARDENING AND TEMPERING
Bellevue Furnace Co., Detroit, Mich.
Brown & Sharpe Mfg. Co., Providence, R.I.
Chicago Flexible Shaft Co., Chicago, Ill.
Gilbert & Barker Mfg. Co., Springfield.
Mechanical Eng'r'g Co., Three Rivers, Q.
Standard Fuel Engr. Co., Detroit, Mich.
Williams & Wilson, Ltd., Montreal, Que.

FURNACES, BLAST
Bellevue Industrial Furnace Co., Detroit.
Toronto Iron Works, Ltd., Toronto.

FURNACES, FORGING
Gilbert & Barker Mfg. Co., Springfield.

FUSE BOXES, STEEL
Dom. Forge & Stamp. Co., Walkerville.

GANG PLANER TOOLS
Armstrong Bros. Tool Co., Chicago.

GAS AND STEAM ENGINES
Mesta Machine Co., Pittsburgh, Pa.

GASKETS, LEATHER, ETC.
Graton & Knight Mfg. Co., Montreal.

GASOLINE METERS
Bowser Co., Ltd., S. F., Toronto, Ont.

GASOLINE TANKS
Bowser Co., Ltd., S. F., Toronto, Ont.

GASOLINE PUMPS, SELF-MEASURING
Bowser Co., Ltd., S. F., Toronto, Ont.
Brown & Sharpe Mfg. Co., Providence, R.I.

GAUGES
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GAUGERS, CALIPERS
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Taylor Instrument Co., Rochester, N.Y.

GAUGES, HYDRAULIC
Taylor Instrument Co., Rochester, N.Y.

GAUGES, MANUFACTURERS, LIMIT, THREAD
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Wells Bros. of Can., Galt, Ont.

GAUGES, STANDARD
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Canadian Fairbanks-Morse Co., Montreal.
Cleveland Twist Drill Co., Cleveland.
Garvin Machine Co., New York.
Illinois Tool Works, Chicago, Ill.
C. E. Johanson, Inc., Toronto, Ont.
Morse Twist Drill & Machine Co., New Bedford.
Peck, Stow & Wilcox Co., Southington, Conn.
Pratt & Whitney Co., Hartford, Conn
Taylor, J. A. M., 318 Stair Bldg., Toronto
Toronto Tool Works, Toronto, Ont.
Wells Brothers Co. of Canada, Galt, Ont.
Worth Engineering Co., Toronto, Ont.

GAUGES, THREAD
Bicknell-Thomas Co., Greenfield, Mass.

GAUGES, VACUUM AND PRESSURE
Bristol Co., Waterbury, Conn.
Taylor Instrument Co., Rochester, N.Y.

GAUGES, SNAP, THREAD AND CYLINDRICAL
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GEAR BLANKS
Can. Steel Foundries, Ltd., Montreal.
Dom. Found. & Steel, Hamilton, Ont.
Kayser-Ellison & Co., Ltd., Montreal.
Norton, Ralph B., Agent, Montreal.
Wilson & Co., J. C., Belleville, Ont.
Williams & Co., J. H., Brooklyn, N.Y.

GEAR BLANKS, CAST
Katie Foundry, Galt, Ont.

GEAR SHAPERS AND CUTTERS
Fellows Gear & Shaper Co., Springfield, V.

GEAR-CUTTING MACHINERY
Bilton Mach. Tool Co., Bridgeport, Conn.
Fellows Gear & Shaper Co., Springfield, V.
Garlock-Walker Mchy. Co., Toronto, Ont.
D. E. Whiton Machine Co., New London, Conn.
A. R. Williams Machy. Co., Toronto.
Williams & Wilson, Ltd., Montreal, Que.

GEAR-TESTING MACHINE
Gisholt Machine Co., Madison, Wis.

GEAR-TURNING MACHINES, BEVEL
Bridgeford Mach. Tool Wks, Rochester

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Coventry Chain Co., Coventry, Eng.

GEARS, CHAIN
Morse Chain Co., Ithaca, New York.

GEARS, COMPENSATING
Morse Chain Co., Ithaca, New York.

GEARS, CUT, MORTISE, ANGLE, WORM
Baxter & Co., Ltd., J. R., Montreal.
Can. Link-Belt Co., Toronto, Ont.
Dominion Bridge Co., Montreal, Que.
Dom. Foundries & Steel, Hamilton, Ont.
Gardner, Robt., & Son, Montreal.
Grant Gear Works, Boston, Mass.
Hamilton Gear & Machine Co., Toronto.
Hull Iron & Steel Found., Ltd., Hull, Q.
Illinois Tool Works, Chicago, Ill.
Jones & Glassco, Montreal.
Wm. Kennedy & Sons, Ltd., Owen Sound, Ont.
Philadelphia Gear Works, Philadelphia.
Victoria Foundry Co., Ottawa.
Wilson & Co., J. C., Belleville, Ont.

GEARS, RAWHIDE
Gardner, Robt., & Son, Montreal.
Grant Gear Works, Boston, Mass.
Hamilton Gear & Machine Co., Toronto.
Jones & Glassco, Montreal.
Philadelphia Gear Works, Philadelphia.
A. R. Williams Machy. Co., Toronto.

GENERATORS, GEAR
Fellows Gear & Shaper Co., Springfield, V.

GEARS, SPRING
Morse Chain Co., Ithaca, New York.

GEARS, SPUN, BENCH, SPIRAL
Brown & Sharpe Mfg. Co., Providence, R.I.

GEARS, SILENT CHAIN GENERATORS, STEAM TURBO
Can. General Electric Co., Toronto, Ont.

GENERATORS AND CONVERTORS
Can. General Electric Co., Toronto, Ont.

GENERATORS, MOTOR
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Williams & Wilson, Ltd., Montreal.
MacGovern & Co., Montreal.

GERMAN SILVER
Brown's Copper & Brass Rolling Mills, New Toronto, Ont.

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Strong, Kennard & Nutt Co., Cleveland.

GLUE HEATERS
Oliver Machinery Co., Grand Rapids, Mich

GLASSES, SAFETY
Strong, Kennard & Nutt Co., Cleveland.
Willson & Co., Inc., T. A., Reading, Pa.

GOVERNOR, WATER WHEEL
Wilson & Co., J. C., Belleville, Ont.

GRAPHITE
Aikenhead Hardware, Ltd., Toronto.
Rice Lewis & Son, Toronto.

GOGGLES
Consolidated Optical Co., Toronto.
Standard Optical Co., Geneva, N.Y.
Strong, Kennard & Nutt Co., Cleveland.
Willson & Co., Inc., T. A., Reading, Pa.
Welding & Supplies Co., Montreal.

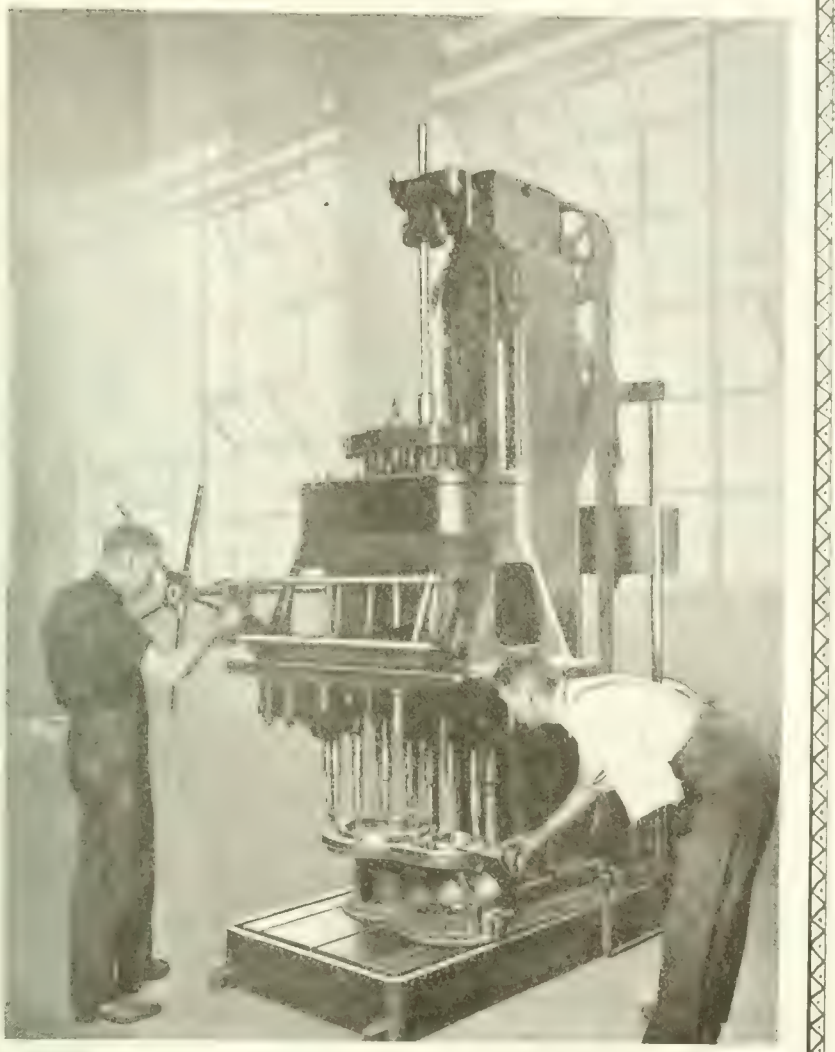
GRAVITY CARRIERS
Can. Link-Belt Co., Toronto, Ont.
Jones & Glassco, Montreal.
Morris Crane & Hoist Co., Ltd., Herbert, Niagara Falls, Ont.

GREASE CUPS, PRESSED STEEL, BRASS
Can. Winkley Co., Ltd., Windsor, Ont.

GREASES (See Lubricants)

GRINDERS, AUTOMATIC KNIFE
Canada Machinery Corp., Galt, Ont.
Foss Mchy. & S'ply Co., G. F., Montreal
Garlock-Walker Machinery Co., Toronto.

GRINDERS, CENTRE COLUMN, PEDESTAL AND BENCH
Wisconsin Electric Co., Inc., Racine, Wis.
Can. Machinery Corp., Galt, Ont.



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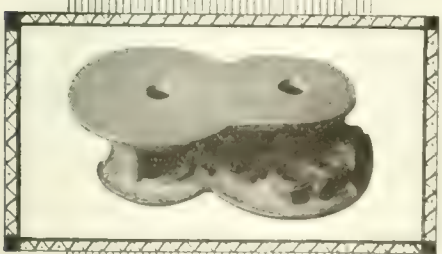
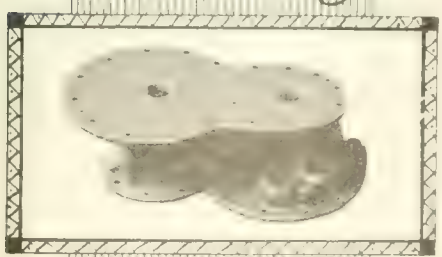
"Very Satisfactory"—

Says Mr. Mooney of the Canadian Westinghouse Co.

Consider the fact that this NATCO has been in service but a short time, that it is already drilling 640 holes in an hour, and you get a better idea of what this "very satisfactory" endorsement means. For while the NATCO is comparatively easy to operate, it is nevertheless true that output increases as the operator becomes thoroughly familiar with the NATCO.



Before Drilling



After Drilling

Forty-four holes, 25/32 inch in diameter and varying from 1 to 2 inches in depth, are drilled into 15 of these cast iron Centerpieces and Cylinders every hour. Even if the holes were of widely varying diameters the NATCO would still drill them all in two operations (22 holes on each side). In fact, the NATCO patented multi-speed feature provides the proper cutting speed for each size tool so that tapping, reaming, counterboring, etc., on different size holes becomes one operation.

Built in 11 sizes, ranging from 2 to 72 spindles, NATCOS can bring proportionate results on widely different work.

Send us blueprints and we will furnish you production estimates—gratis

We also design and build jigs and fixtures for use in connection with NATCO Multi-Drillers.

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Richmond, Indiana, U.S.A.

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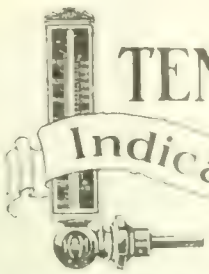

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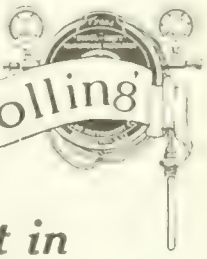

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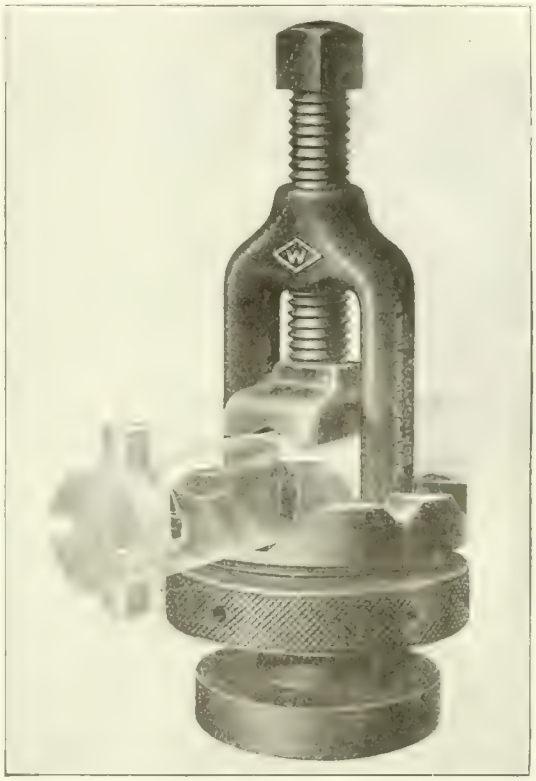

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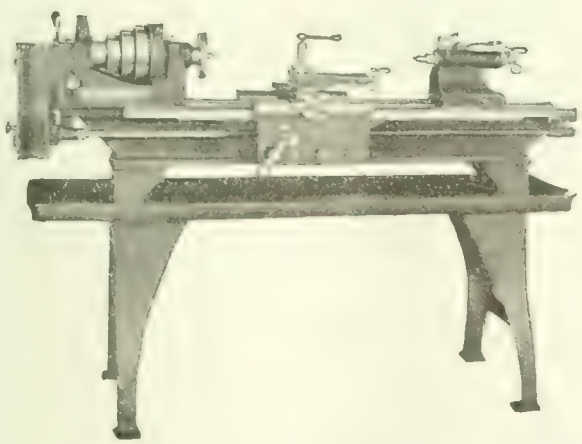

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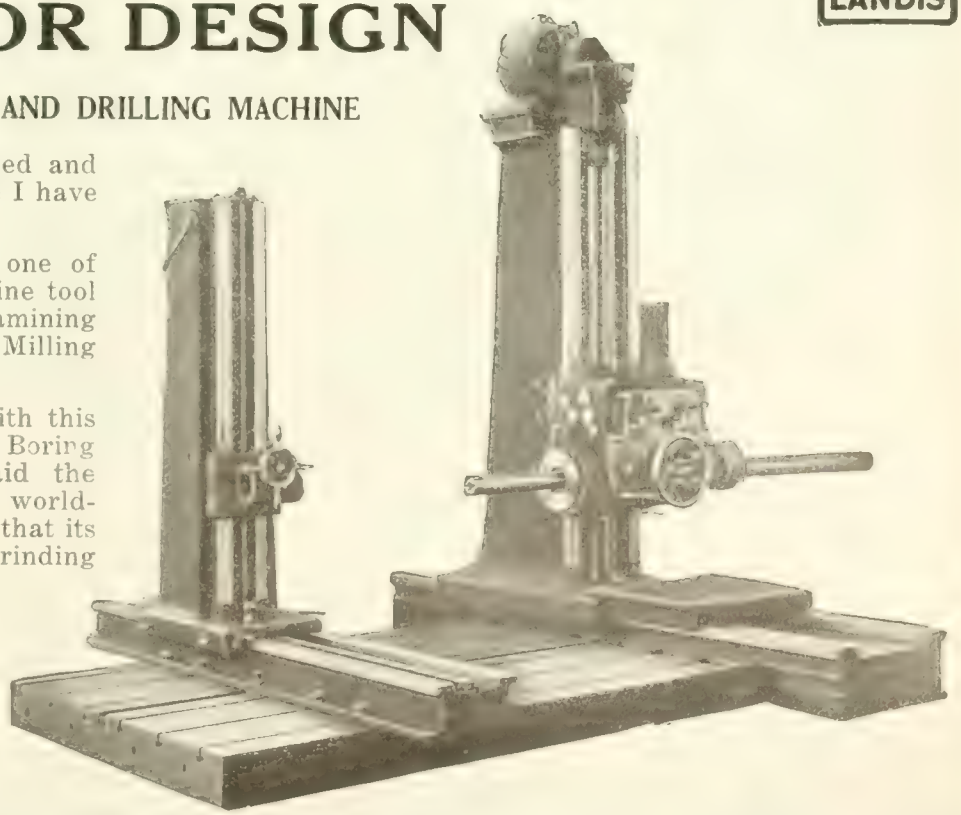

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Oliver Mach. Co., Grand Rapids, Mich.

SAW BENCHES
Oliver Mach. Co., Grand Rapids, Mich.

SAW GUARDS
Oliver Mach. Co., Grand Rapids, Mich.

SAWS SWING
Oliver Mach. Co., Grand Rapids, Mich

STAYBOLT TOPS
Butterfield & Co., Inc., Rock Island, Que
Greenfield Tap & Die Corp., Greenfield, Mass.
Wells Bros. of Can., Galt, Ont.

STAIRS, IRON
Canada Wire & Iron Goods Co., Hamilton, Ont.

STAMPINGS, SHEET BRASS, COPPER, ALUMINUM AND STEEL
Dom. Forge & Stamping Co., Walkerville
Homer & Wilson, Hamilton, Ont.

STAMPING MACHINERY
Bliss Co., E. W., Brooklyn, N.Y.
Brown, Boggs, & Co., Hamilton, Can.
Canada Machinery Corp., Galt, Ont.

STAMPS, STEEL ALPHABET, FIGURES
Hoggson & Pettis Mfg. Co., New Haven, Conn.
Matthews, Jas. H & Co., Hartford, Conn.
Pritchard-Andrews Co., Ottawa, Can.

SAFETY CYLINDERS
Oliver Mach. Co., Grand Rapids, Mich.

STEAM APPLIANCES
Darling Bros., Ltd., Montreal, Quebec.

STEAM SEPARATORS AND TRAPS
Can. Fairbanks-Morse Co., Montreal.

STEEL BALLS
See Balls Steel.

STEEL, CRUCIBLE TOOL
Atkins & Co., Ltd., Wm. Sheffield, Eng.
Illingworth Steel Co., John, New York.
Kayser-Ellison & Co., Ltd., Montreal.
Marshall, Son & Bunney, Toronto.
Norton, Ralph B., Agent, Montreal.

STEEL, CARBON, FERRO-TUNGSTEN
Armstrong, Whitworth of Can., Montreal.
Atkins & Co., Ltd., Wm., Sheffield, Eng.
Boker & Co., Inc., H., Montreal, Que.
Firth & Sons, Thos., Montreal, Que.
Kayser-Ellison & Co., Ltd., Montreal.
Marshall, Son & Bunney, Toronto.
Norton, Ralph B., Agent Montreal.
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Vanadium-Alloys Steel Co., Pittsburgh.

STEEL CHROME VANADIUM
Blaneke Co., L. C., New York City.
General Steel Co., Milwaukee, Wis.
Kayser-Ellison & Co., Ltd., Montreal.
Norton, Ralph B., Agent, Montreal.
Atkins & Co., Ltd., Wm. Sheffield, Eng
Marshall, Son & Bunney, Toronto.

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General Steel Co., Milwaukee, Wis.
Kayser-Ellison & Co., Ltd., Montreal.
Norton, Ralph B., Agent, Montreal.
Atkins & Co., Ltd., Wm., Sheffield, Eng.
Marshall, Son & Bunney Toronto.

STEEL CASTINGS
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Kennedy & Sons, Wm., Owen Sound.
Electric Steel & Metals Co., Welland.
Nova Scotia Steel & Coal Co., Windsor.
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Atkins & Co., Ltd., Wm., Sheffield, Eng.
Can Drawn Steel Co., Hamilton, Ont.
Kayser-Ellison & Co., Ltd., Montreal.
Norton, Ralph B., Agent, Montreal.
Rice Lewis & Son, Toronto, Ont.
Swedish Steel & Importing Co. Ltd., Montreal
Union Drawn Steel Co., Hamilton, Ont.
Warrington & Co., J. N., Montreal, P.Q

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Atkins & Co., Ltd., Wm., Sheffield, Eng.
Blaneke Co., L. C., New York City
Firth & Sons, Thos., Montreal, Que.
Kayser-Ellison & Co., Ltd., Montreal.
Marshall, Son & Bunney, Toronto.
Norton, Ralph B., Agent, Montreal.

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Wm. Atkins & Co., Sheffield, Eng
Boker & Co., Inc., H., Montreal, Que.
Can. Fairbanks-Morse Co., Montreal
Firth & Sons, Thos., Montreal, Que.
Hawkridge Bros. Co., Boston, Mass.
Illingworth Steel Co., J., New York.
Kayser Ellison & Co., Sheffield, Eng
Latrobe Electric Steel Co., Latrobe, Pa.
Marshall, Son & Bunney, Toronto, Ont.
Ralph B. Norton, Montreal, Que.
Plewes, Ltd, Winnipeg, Man.
Pilot Steel & Tool Co., Montreal, Que.
Rice Lewis & Son, Toronto, Ont.
Swedish Steel & Importing Co., Ltd., Montreal.
Vanadium-Alloys Steel Co., Pittsburgh.

STEEL, CHROME, MANGANESE
Joliette Steel Co., Montreal, Que.

STEEL, OPEN HEARTH
Illingworth Steel Co., John, New York.

STEEL, CRUSHED
Pittsburgh Crushed Steel Co., Pittsburgh.

STEEL, ROCK DRILL
Armstrong, Whitworth of Canada, Montreal, Que.
Kayser-Ellison & Co., Ltd., Montreal.
Norton, Ralph B., Agent, Montreal.

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MacKinnon Steel Co., Sherbrooke, Que.

STEEL, TOOL
Armstrong, Whitworth of Can., Montreal.
Atkins & Co., Wm., Sheffield, Eng.
Blaneke Co., L. C., New York City.
Boker & Co., Inc., H., Montreal, Que.
Can. Fairbanks-Morse Co., Montreal.
Drury Co., H. A., Montreal, Que.
Firth & Sons, Thos., Montreal, Que.
Hawkridge Bros. Co., Boston, Mass.
Kayser-Ellison & Co., Ltd., Montreal.
Marshall, Son & Bunney, Toronto, Ont.
Norton, Ralph B., Agent, Montreal.
Latrobe Electric Steel Co., Latrobe, Pa.
Pilot Steel & Tool Co., Montreal, Que.
Rice Lewis & Son Toronto, Ont.
Vanadium-Alloys Steel Co., Pittsburgh.

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Armstrong, Whitworth of Can., Montreal.
Drury, H. A., Co., Montreal, Que.
Kayser-Ellison & Co., Ltd., Montreal.
Marshall, Son & Bunney, Toronto.
Norton, Ralph B., Agent, Montreal.
Vanadium-Alloys Steel Co., Pittsburgh.
Wells Bros. of Can., Galt, Ont.

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Morris Crane & Hoist Co., Herbert, Niagara Falls, Ont.

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Greenfield Tap & Die Corp., Greenfield, Mass.
Wells Bros., of Can., Galt, Ont.

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A. B. Jardine & Co., Ltd., Hespeler, Ont.
Rice Lewis & Son, Toronto, Ont.
Wells Bros., Co., of Canada, Galt, Ont.

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Baird Machinery Co., Bridgeport, Conn.
Bertrams, Ltd., Edinburgh, Scotland.

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William Hamilton Co., Peterboro, Ont.

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Hoggson & Pettis Mfg. Co., New Haven Conn.

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Whitman & Barnes Co., St. Catharines.

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Can. Steel Foundries, Ltd., Montreal.

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Panghorn Corporation, Hagerstown, Md.

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Dom. Forge & Stamping Co., Walkerville.
MacKinnon Steel Co., Sherbrooke, Que.
St. Lawrence Welding Co., Montreal, Que.
Marshall, Son & Bunney, Toronto.

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Bowser Co., Ltd., S. F., Toronto, Ont.

TANKS, RUBBER CEMENT
Bowser Co., Ltd., S. F., Toronto, Ont.

TANKS, STEEL, WATER PRESSURE
Bowser Co., Ltd., S. F., Toronto, Ont.
Dominion Bridge Co., Montreal, Quebec.
MacGovern & Co., Montreal, Que.
MacKinnon Steel Co., Sherbrooke, Que.
St. Lawrence Welding Co., Montreal, Que.
Toronto Iron Works, Ltd, Toronto.

TANK WAGONS
MacKinnon Steel Co., Sherbrooke, Que.
St. Lawrence Welding Co., Montreal.
Toronto Iron Works, Ltd., Toronto.

TANKS
Can. Ingersoll-Rand Co., Ltd., Sherbrooke
Elec. Steel & Metals, Welland Ont.
MacKinnon Steel Co., Sherbrooke, Que.
William Hamilton Co., Peterboro, Ont.

TAPER PINS
Galt Machine Screw Co., Ltd., Galt, Ont.

TAPES, MEASURING
James Chesterman & Co., Ltd., Sheffield, Eng.
Rice Lewis & Son, Toronto, Ont.

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Bertram, John & Sons Co., Dundas.
Bicknell-Thomas Co., Greenfield, Mass.
Rudel-Belnap Mach. Co., Ltd., Montreal.
Canada Machinery Corp., Galt, Ont.
Garvin Machine Co., New York.
The Geometric Tool Co., New Haven.
J. H. Hall & Sons, Brantford, Ont.
A. B. Jardine & Co., Hespeler, Ont.
Landis Machine Co., Waynesboro, Pa.
Modern Tool Co., Erie, Pa.
Murchy Machine & Tool Co., Detroit.
Niles-Bement-Pond Co., New York.
Rickert-Shafer Co., Erie, Pa.
National-Acme Co., Cleveland, Ohio.
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Whitney Mfg. Co., Hartford, Conn.
Williams & Wilson, Limited, Montreal.

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TAPES, POCKET
Lufkin Rule Co. of Can., Windsor, Ont.

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Butterfield & Co., Rock Island, Que.
Geometric Tool Co., New Haven.
Modern Tool Co., Erie, Pa.
Murchey Machine & Tool Co., Detroit.
Pilot Steel & Tool Co., Montreal, Que.
Victor Tool Co., Waynesboro, Pa.

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Greenfield Tap & Die Corp., Greenfield, Mass.
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TAPS, MACHINE RELIEVED
Butterfield & Co., Inc., Rock Island, Que.
Greenfield Tap & Die Corp., Greenfield, Mass.
Wells Bros. of Can., Galt, Ont.

TAPS, MACHINE SCREW
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Greenfield Tap & Die Corp., Greenfield, Mass.
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Butterfield & Co., Inc., Rock Island, Que.
Atkins & Co., Ltd., Wm., Sheffield, Eng.
Greenfield Tap & Die Corp., Greenfield.
Marshall, Son & Bunney, Toronto
Wells Bros. of Can., Galt, Ont.

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Greenfield Tap & Die Corp., Greenfield.
Wells Bros. of Canada, Galt, Ont.

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Can. Fairbanks-Morse Co., Montreal.
Cleveland Twist Drill Co., Cleveland.
Foss Mchy. & Sply. Co., G. F., Montreal.
Geometric Tool Co., New Haven
Greenfield Tap & Die Corp., Greenfield.
Jardine & Co., A. B., Hespeler, Ont.
Landis Machine Co., Waynesboro, Pa.
Morse Twist Drill & Mchy. Co., New Bedford, Mass.
Murchey Machine & Tool Co., Detroit.
Pratt & Whitney Co., Dundas, Ont.
Rice Lewis & Son, Toronto, Ont.
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Wells Bros. of Canada, Galt, Ont.
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Taylor Instrument Co., Rochester, N.Y.

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Bristol Co., Waterbury, Conn., U.S.A.
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Shore Instrument & Mfg. Co. New York.

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Williams & Wilson, Ltd., Montreal, Que.

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Landis Machine Co., Waynesboro, Pa.
Pratt & Whitney Co., Dundas, Ont.
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Williams & Co., J. H., Brooklyn, N.Y.

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See Screws.

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Rice Lewis & Son, Toronto, Ont.
Williams & Co., J. H., Brooklyn, N.Y.

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Graton & Knight Mfg. Co., Montreal.

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Williams & Co., J. H., Brooklyn, N.Y.
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Strong, Kennard & Nutt Co., Cleveland.

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Page Steel & Wire Co., Adrian, Mich.
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Wheel Trueing Tool Co., Windsor, Ont.
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Can. Ingersoll-Rand Co., Sherbrooke, Que.
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Kennedy & Son, Wm., Owen Sound, Ont.
Morris Crane & Hoist Co., Herbert, Niagara Falls, Ont.
Northern Crane Works, Walkerville.

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Norton, Ralph B., Agent, Montreal.

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Baird Machine Co., Bridgeport, Conn.
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Page Steel & Wire Co., New York, N.Y.

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WIRE, LINK FABRIC
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Page Steel & Wire Co., New York, N.Y.
Parmenter & Bulloch Co., Gananoque.
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Page Steel & Wire Co., New York, N.Y.

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Page Steel & Wire Co., Adrian, Mich.

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Page Steel & Wire Co., New York.
Steel Co. of Canada, Ltd., Hamilton, On.

WIRE, TELEPHONE, TELEGRAPH, GALVANIZED AND ELECTRICAL
Page Steel & Wire Co., Adrian, Mich.

WIRE, WEAVING, MONEL METAL, BRASS, COPPER, GOLDEN BRONZE, HIGH BRASS, LOW BRASS, NICKEL
Can. Driver-Harris Co., Ltd., Walkerville.

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Canada Machinery Corp., Galt, Ont.
Cleveland Pneumatic Tool Co. of Canada, Toronto.
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Wells Bros. of Canada, Galt, Ont.
Whitman & Barnes Co., St. Catharines.
Whitman & Barnes Mfg. Co., Akron, O.

WOVEN STEEL PARTITIONS
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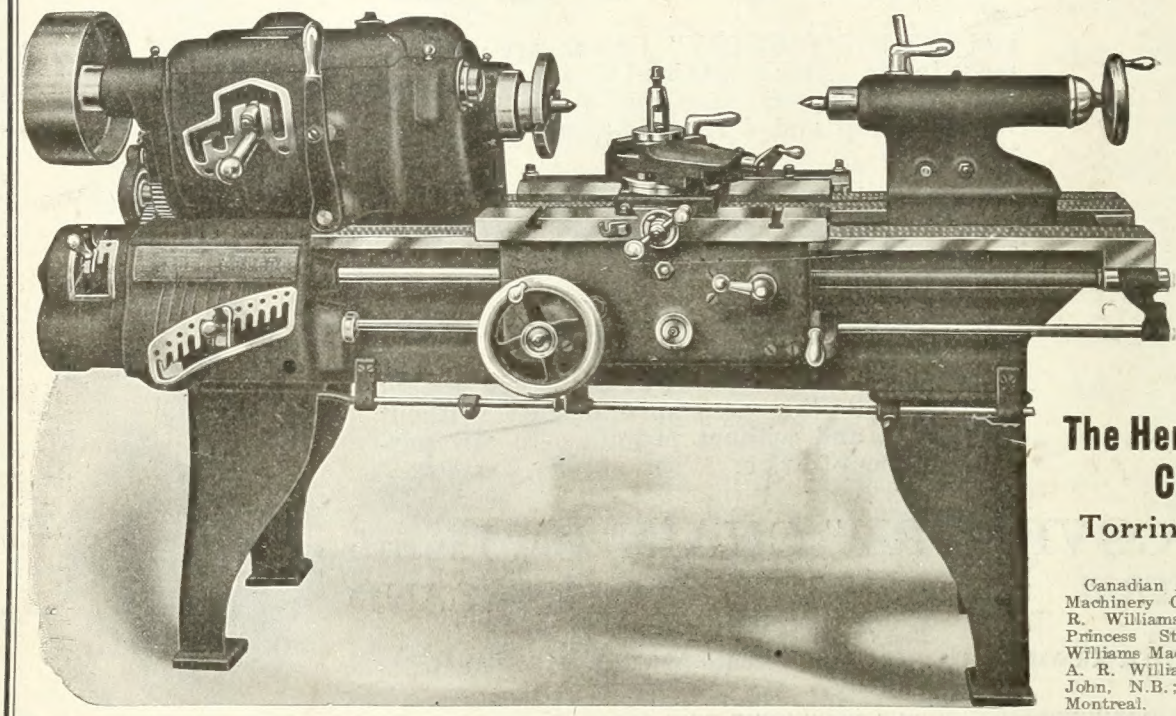

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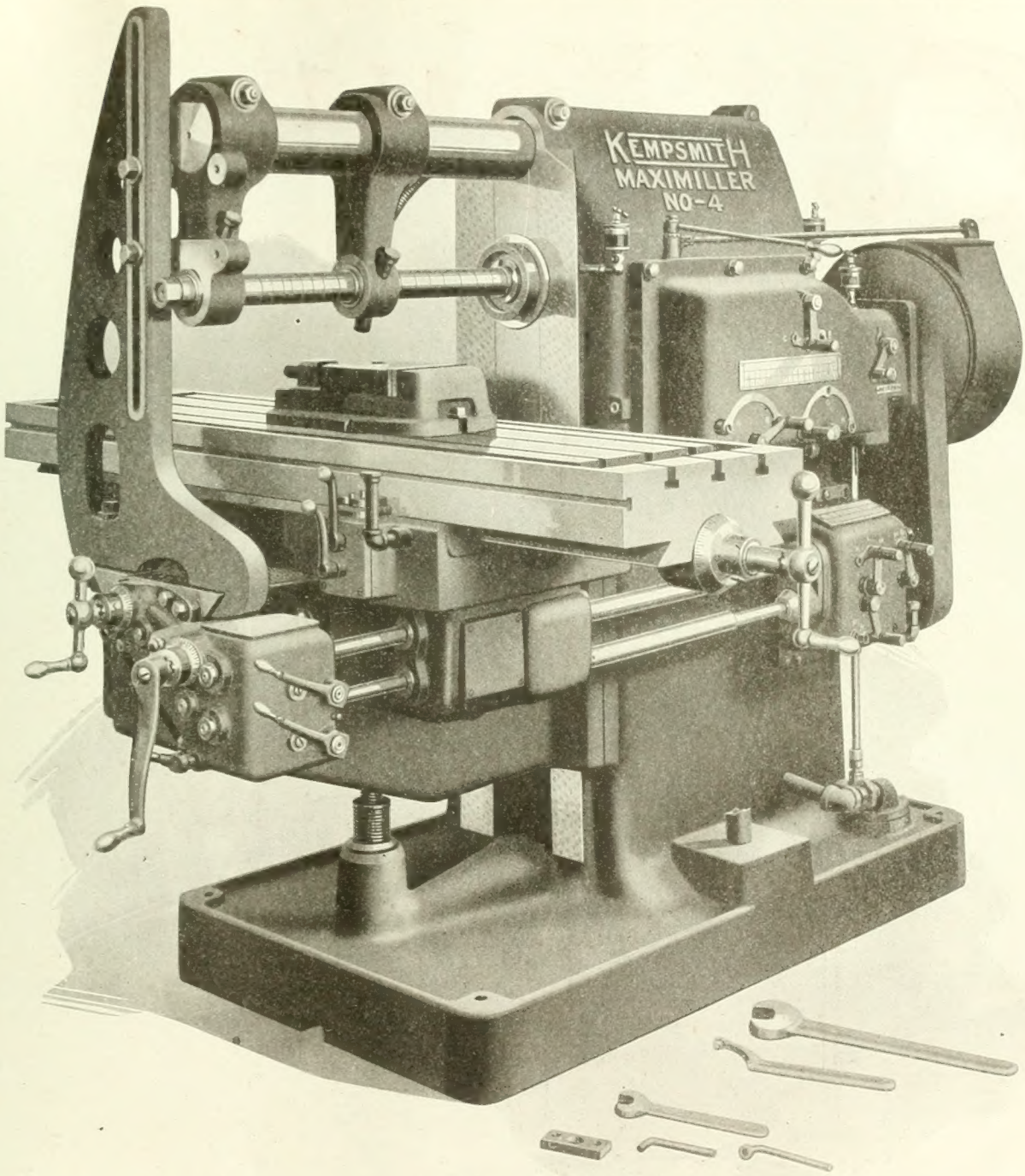

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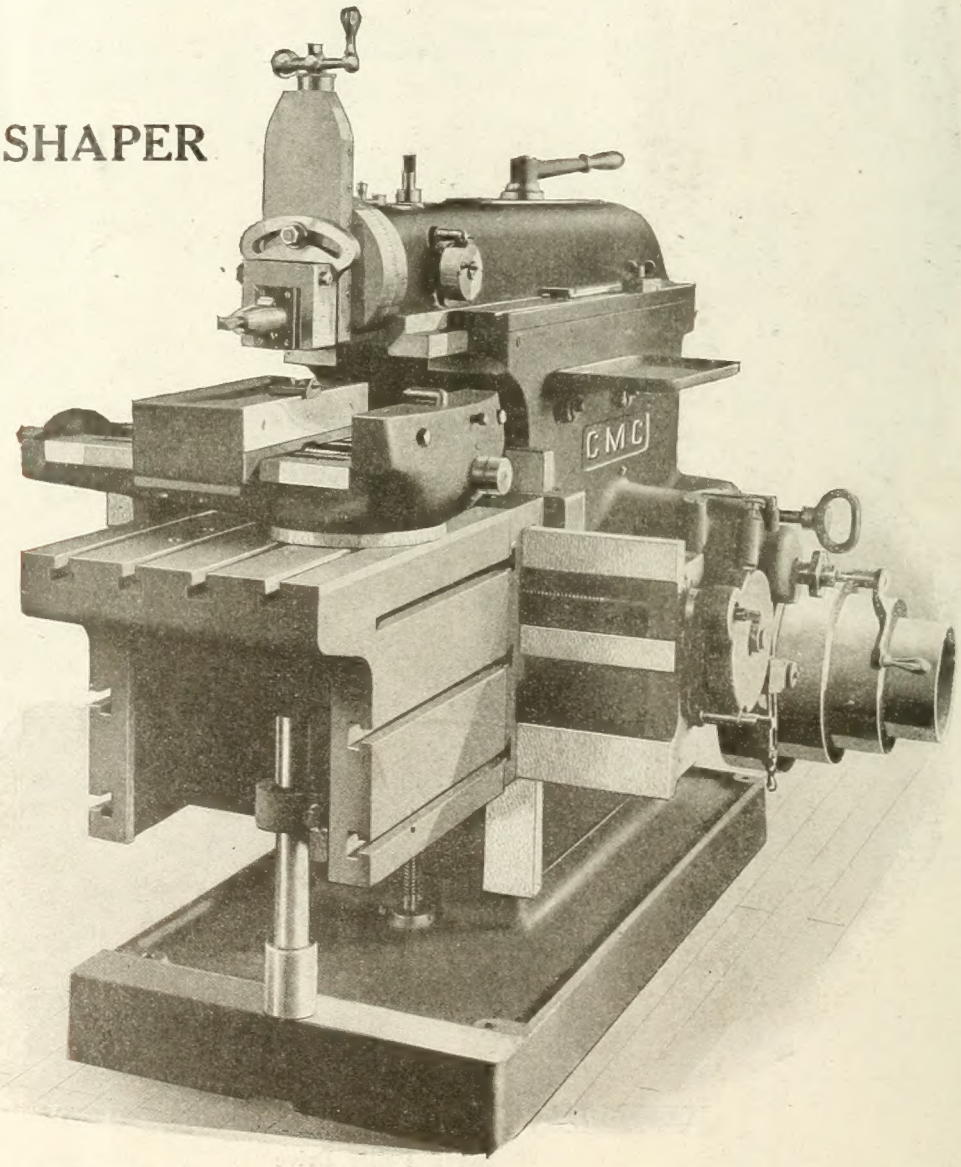

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